DOCUMENT RESUME

ED 446 893 SE 060 472

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| AUTHOR | Todd, John J., Ed. |
| TITLE | Earthlinks '97: Proceedings of the Biennial National Conference of the Australian Association for Environmental Education and the Marine Education Society of Australasia (9th, Hobart, Tasmania, Australia, January 13-17, 1997). |
| INSTITUTION | Australian Association for Environmental Education, Tasmania. Tasmanian Branch. |
| ISBN | ISBN-0-9586537-5-5 |
| PUB DATE | 1997-00-00 |
| NOTE | 322p.; Also produced by the Marine Education Society of Australasia. |
| AVAILABLE FROM | Australian Association for Environmental Education, P.O. Box 474, Griffith University, Nathan-Queensland 4111, Australia. For full text: http://www.education.uts.edu.au/projects/AAEE. |
| PUB TYPE | Collected Works - Proceedings (021) |
| EDRS PRICE | MF01/PC13 Plus Postage. |
| DESCRIPTORS | Educational Technology; Elementary Secondary Education; *Environmental Education; Foreign Countries; Higher Education; Instructional Materials; Multimedia Instruction; Teaching Methods |
| IDENTIFIERS | Australia |

ABSTRACT

This document contains the proceedings of the 9th Biennial National Conference of the Australian Association for Environmental Education and the Marine Society of Australasia. The contents provide a valuable snapshot of the state of environmental education in Australia while moving towards the end of the 20th century. Papers include: (1) "Stand Up, Stand Up and Be Counted: Exploring Three Myths in Environmental Education" (Fien, J.); (2) "Learning through Landscapes: The Importance of School Grounds" (Lucas, B.); (3) "Using a Multimedia Approach to Design an Environmental Education Package" (Albion, I.); (4) "What Difference Can a Good Question Make? An Introduction to Strategic Questioning" (Allan, B.; Shields, K.); (5) "The Role of Environmental Interpretation in the Management of the Natural Resources in a Recreational Area" (Arevalo-Vigne, I.; Adams, M.); (6) "AWARE (Victoria): Educators Who Talk Rubbish" (Armstrong, P.); (7) "Educating about Genetic Engineering: The Hard Cell to Buy New Genes" (Benn, K.); (8) "EnviroSchool: A Model for Environmental Education at the Secondary-Tertiary Interface" (Buchan, G.D.; Leonard, R.L.; Shore, B.); (10) "Conservation Districts: More Than 50 Years of Community-Based Conservation in the United States" (Chandler, J.); (11) "Community Education for Waste Reduction: A Review of Education Programs in NSW" (Collier, G.); (12) "Bangor Landcare in Action Engendering a Natural Relationship" (Daly, C.; Dunbabin, T.); (13) "Environmental Education in Early Childhood: Exploring the Links" (Elliot, S.); (14) "The Development of Pedagogical Theory for Environmental Science and Management Studies" (Ernsteins, R.); (15) "Interactive Displays and the Environmental Message" (Evans, D.); (16) "Into the Dragon's Lair, a Community-based, Marine Monitoring Project" (Flaherty, T.; Russell, V. J.); (17) "Making Links: Small Businesses, the Environment and the Community the SOLUTIONS to POLLUTION Small Business and Industry Environmental Review and Education Program" (Ford, C.; Maheshwari, M.); (18) "Mentoring of

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## Australian Association for Environmental Education

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# Conference Proceedings

Earthlinks '97

National Conference
Hobart, Tasmania
13–17 January 1997

SE064472

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# *Earthlinks'97*

PROCEEDINGS
OF THE
9th BIENNIAL NATIONAL CONFERENCE

OF THE

AUSTRALIAN ASSOCIATION FOR ENVIRONMENTAL EDUCATION

AND THE

MARINE EDUCATION SOCIETY OF AUSTRALASIA

HELD FROM
13 TO 17 JANUARY 1997
AT
THE UNIVERSITY OF TASMANIA
HOBART

Editor: J J Todd

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Published 1997 by
Australian Association for Environmental Education (Tasmanian Branch)
c/- The Tasmanian Environment Centre,
102 Bathurst St Hobart Tasmania 7000 Australia

Printed at UniPrint, University of Tasmania

Paper - 100% recycled *Prologue* (Australian made)

Papers presented at this conference are available on the Internet at:
http://www.education.uts.edu.au/projects/AAEE

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ISBN 0 9586537 5 5

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## A Welcome from Nel Smit, Conference Convenor

Welcome to *Earthlinks'97*, the ninth Biennial Conference of the Australian Association for Environmental Education and the Marine Education Society of Australasia, held in Hobart, Tasmania, 13-17 January 1997.

We in Tasmania have a sense of being small and left off the map. We are coming to assert that small is beautiful, that we are part of a special place at the end of the world - the last stop before Antarctica. This conference gives us an opportunity to show off. In planning the conference we have been able to identify what is special about Tasmania, about our precious piece of the Earth, with people who have a sense of that specialness which they interpret through their art - through music and visuals, in photography, wood and installation. It is with great pride that we bring together our network in the interpretation of our sense of place which we share with you. You will experience some of our special places on the field trips, and make your own interpretations.

We thought long and hard, over many late night bottles of Tasmanian wine, to settle on the conference theme. *Earthlinks*. It sounds like 'earthlings' someone said. And we are creatures of the Earth. It can be easy to forget as we sit at our computers. Many children have no sense of connection with the earth. They might start the day with Coco Pops and morning television, get driven to school, spend their day in a classroom, play on asphalt, take the bus home, play computer games and go to bed. We are here ultimately to help kids to step off the footpath, to encourage kids to touch the earth before touching a keyboard.

*Earthlinks'97* is about connecting for the Earth. We have organised a program to help you make some valuable connections for the Earth.

Our conferences are like meetings of the tribe, where like minded people have a chance to connect with their interest area, to learn, to be challenged and excited by new ideas in environmental education. We hope all this happens to you and you too feel the connection and draw strength from it to go forward toward a sustainable future. To help you get excited we have planned a diverse program with over 130 presentations linked with the strands of ecology, education, culture and community. Focus sessions include Waterwatch, National Professional Development Program, research, the Policy Forum and the Youth Forum.

Our tribe has global connections. Welcome to our friends and elders who have come to join us from the UK. Austria, Canada, USA, Netherlands, the Philippines, Latvia and New Zealand. We look forward to strengthening those connections over some tasty Tasmanian turps and tucker .

We have been committed to making the conference proceedings available at the conference for your reference. Presentations which did not make the deadline for publication will be included in the proceeding published on the Internet. We hope these proceedings become a valued document for your ongoing reference.

Nel Smit
For the Organising Committee
January 1997

## Conference Organising Committee

Nel Smit - Conference Convenor
Christian Bell
Robyn Brake
Sarah Burton
Juliet Chapman
Susanna van Essen
Jocelyn Phillips
Helen Pryor
Tania Stadler
Veronica Thorp
John Todd

Dickensons Conference Management provided all the management services for the conference and the Committee is particularly grateful to Kent Harbutt for his efforts and commitment to the conference.

The Committee would also like to thank Kim Walker, Helen Sharp and Geoff Young from the National Executive of the Australian Association for Environmental Education for their advice and contributions to the conference organisation.

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## A Few Words from the Editor

The mix of papers in this proceedings provides a valuable 'snapshot' of the state of environmental education in Australia as we move towards the end of the 20th century. Thirty eight papers cover a wide range of environmental issues in Australia. These are supplemented by seven papers dealing with some interesting environmental education issues in a cross-section of developed and developing countries.

It is particularly encouraging to see a number of papers on industry issues joining the academic and community themes. This move to greater cooperation, rather than confrontation, between industry and the 'environment movement' is most welcome. It mirrors similar, recent developments in other countries and should lead to many new opportunities for environmental educators.

It is also a pleasure to have a number of papers prepared by individuals who have not had the backing of large organisations such as government departments and universities. Their views, together with numereus reports of successful community education programs operating for several years, provides a refreshing optimism which builds on the theoretical foundations presented in the more academic papers.

I would like to take this opportunity to put in a plug for printed proceedings in this electronic age. Our organising committee deliberated the relative merits of printed proceedings, proceedings on a floppy disk and proceedings available on the Internet. We chose a mix of printed and Internet as giving the optimum combination of convenience, accessibility and permanence. The printed version is the most expensive and uses the most resources; but this print medium allows one to sit back in an arm chair and browse through papers, picking up ideas in a very different way to running a key-word search through an electronic version of the proceedings while sitting in an ergonomic chair in front of a computer screen. The electronic version will still be available shortly after the conference is over. The address for this version of the proceedings is http://www.education.uts.edu.au/projects/AAEE. The electronic version will include all papers published here, plus any papers submitted too late for our print deadline. It also does not require any page limits on the papers (so some will be a longer version than included here).

For those concerned about the resource use question, consider the environmental impact of delegates' travel. Transport contributes by far the greatest impact of national conferences such as ours. Of course, this is no excuse for other resource use, but our aim must be to get the maximum environmental benefit from the overall activity. In the case of this conference, where the exchange of ideas and intellectual stimulation are the key outcomes, I think these printed papers significantly improve the ratio of positive environmental outcomes relative to the environmental burdens associated with the running of the conference.

The proceedings are only one of the many outcomes of the conference. Probably on top of the list is the opportunity the conference provides for meeting colleagues, renewing old friendships and making new ones. There is no substitute for this personal interaction. The conference also provides a chance to focus on the issues of environmental education for a whole week, quite a luxury in this age of maximum efficiency, time lines and economic rationalism. The full conference includes 81 papers, 48 workshops, field trips, meetings and many opportunities for informal interaction.

Finally, some comment on our selection of papers. Abstracts of offered papers were reviewed by Dr Tania Stadler and myself. Any we were uncertain about were reviewed by the whole conference committee, and we thank those authors who amended their intended papers to more closely fit the theme of the conference. Most papers were supplied 'camera ready' although a few arrived electronically. As editor, I apologise to authors where a few last minute glitches have left some headings hanging on the last line of a page.

Overall, I think this represents a very broad and interesting selection of papers and I thank all authors for their efforts in getting their papers submitted for inclusion in these proceedings. The assistance provided by Jennie McDonnell in getting the papers organised is also appreciated.

John Todd
January 1997

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# KEYNOTE PRESENTATIONS

Texts for two of the nine conference keynote presentations were available in time to be included in these proceedings. It is hoped that the other keynote addresses will be included in the electronic proceedings on the Internet.

# STAND UP, STAND UP AND BE COUNTED:

## Exploring Three Myths in Environmental Education

**John Fien**

Director, Centre for Innovation and Research in Environmental Education
Griffith University, Brisbane, Australia 4111

## ABSTRACT

This address explores some of the values that underlie different conceptions of sustainable development and suggests that the IUCN conception of "sustainable living" and its world ethic for sustainability provide a post-Rio rationale for environmental education which may help provide direction for its roles in the transition towards a sustainable society. Thus, the paper provides a commentary on the challenges facing those who have a vision of a better, more just and ecologically sustainable world in which to live. This is the challenge of how do we get from here to there? How can we - not only as environmental educators but also as individuals, parents, teachers, communities, nations and peoples - help effect the transition from present day patterns of unsustainable development to ones which are based on principles of social justice and democracy and which respect ecological laws and limits?

The address identifies three implications of the world ethic of sustainability - and the concept of sustainable living - for environmental education. Firstly, it uses the example of teaching about biodiversity to contrast the goals of traditional "environmental studies" with those of education for sustainability. Secondly, it seeks to identify the scope and meaning of the term "education for sustainability" as an approach to environmental education. Thirdly, it explores the challenge that education for sustainability brings to some of the basic assumptions of contemporary environmental education. In questioning these assumptions, the paper seeks to tease and tempt environmental educators with a tantalising vision of what environmental education may be. Thus the paper concludes with the challenge to "stand up and be counted" by asking whether it is enough that we base our professional practice in environmental education solely within progressive child-centred education, that we always try to be objective on matters of values, and that we see our role as one of educating for responsible environmental behaviour.

## INTRODUCTION

The purpose of this paper is to tempt, tease and tantalise environmental educators in Australia with a challenge to reflect on three assumptions that I believe we have accepted uncritically in the past. I have teasingly called these "the three myths of environmental education".

These assumptions may have been appropriate when we thought that the goals of environmental education were to support the nature conservation and environmental management goals of governments and the responsible environmental behaviour of individuals. The AAEE and MESA Conference keynote addresses by John Huckle in 1990 and David Hicks in 1992 taught us that these were limited visions for environmental education while Angelina Galang and Stephan Harding have taught us this week that eco-spirituality and commitment are essential dimensions of environmental education. Similarly, Peter Posch and Bill Lucas have helped us to understand through their presentations this week that schools need to interact closely with their communities in order to build a sustainable world from the local level up.

These expanded visions of environmental education are in line with the expanded notions of environmental education that arose from the Earth Summit in Rio de Janeiro in 1992. For example, the formal resolutions from the conference, titled *Agenda 21*, called for environmental education to abandon its (perhaps all too naive) preoccupation with natural systems in order to incorporate the concept of sustainable development - especially in the way it is concerned as much with issues of peace, human rights, gender, race and social equity as it is with nature conservation. From the Earth Summit's NGO Forum Treaty on Environmental Education for Sustainable Societies and Global Responsibility (NGO Forum 1992) we have the recommendations *inter alia* that:

> 2. Environmental education, whether formal, non-formal or informal, should be grounded in critical and innovative thinking in any place or time, *promoting the transformation and construction of society.*
>
> 3. Environmental education is both *individual and collective* . It aims to develop local and global citizenship with respect for self-determination and the sovereignty of nations.
>
> 4. Environmental education is *not neutral but is value-based. It is an act for social transformation.*
>
> 9. Environmental education must *recover, recognise, respect, reflect and utilise indigenous history and local cultures*, as well as promote cultural, linguistic and ecological diversity. This implies acknowledging the historical perspective of native peoples as a way to change ethnocentric approaches, as well as the encouragement of bilingual education.
>
> 10. Environmental education *should empower all peoples and promote opportunities for grassroots democratic change and participation.* This means that communities must regain control of their own destiny.
>
> 16. Education must help develop *an ethical awareness of all forms of life* with which humans share this planet, respect all life cycles and impose limits on humans' exploitation of other forms of life. (italics added)

Thus, in this paper, I would like to tempt you to consider what environmental education might be like if we took these principles seriously and saw environmental education as a process with the potential to enhance the transition towards a sustainable world.

How can we define the environment and environmental education post-Rio? What role should nature study play in environmental education post-Rio? How should we teach about topics such as biodiversity post-Rio? Should we be neutral on issues of environmental values? And what should be the ultimate objectives of environmental education post-Rio?

These questions are a challenge to those of us who have a vision of a better, more just and ecologically sustainable world in which to live. Making such visions real is the challenge of how do we get from here to there? How can we - as individuals, parents, teachers and communities - help effect the transition from present day patterns of unsustainable development to ones which are based upon principles of social justice and democracy and which respect ecological laws and limits?

I thought that we might set the scene for this transition with a little music. It might help us focus on the responses that education for sustainability requires of us - both personally and professionally. It requires us to reconsider much of what we thought environmental education was and, in the words of Midnight Oil and the Warrumpi Band, it requires us to "Stand Up, Stand Up and be Counted".

## EDUCATION FOR SUSTAINABLE LIVING

We are here today in response to the 1987 United Nations Commission on Environment and Development report called *Our Common Future* which popularised the concept of sustainable development. The General Assembly of the United Nations established this Commission of academics, senior civil servants and politicians, more than half of whom come from developing countries, in 1983. The Commission which was chaired by the Prime Minister of Norway, Mrs Gro Harlem Brundtland, the only national political leader to have ever previously been a Minister for the Environment, had three objectives:

- to investigate global environmental and development issues and propose realistic solutions;
- to recommend new forms of international co-operation appropriate to these solutions; and
- to raise the awareness of the world's citizens, businesses, institutions and governments and increase their readiness to adopt the proposed solutions.

The World Commission took the concept of sustainable development as the focus of its report and urged governments, industries and families to adopt a pattern of development "which meets the needs of present generations without compromising the ability of future generations to satisfy their needs" (World Commission on Environment and Development 1987, p.8). However, this relatively simple concept has been subject to a great variety of interpretations - and inaction through the procrastinatory processes of "paralysis by analysis". To avoid this, let us look at how the term was first used in the 1980 World Conservation Strategy published by IUCN, WWFN and UNEP. Lee Talbot, then Director of IUCN, describes how the term evolved. He described the first draft of the strategy as a

> ..... wildlife conservation textbook, for at the time many conservationists regarded development as the enemy to be opposed and many developers regarded conservationists as at best something to be ignored, or at worst as an obstacle to progress. With each draft the two sides were brought closer and involved a process of education. The final draft represents a consensus [*sic* ]between practitioners of conservation and development. (Cited in Yencken 1994, p.220).

Being the result of a consensus between parties who come from essentially quite distinctive paradigms or world views, sustainable development is not one of those terms that have a simple agreed meaning. Many conservationists argue that ecological sustainability "should be a goal in its own right, unshackled to development" (Yencken 1994, p.220). On the other hand, some argue that it is necessary to put economic sustainability ahead of ecological sustainability because environmental regulations and conservation principles are expensive and businesses need to be profitable to be able to afford them.

Thus, we can see that interpretations of sustainability are value-laden. However, these extreme points of view miss the essential point: the concept of sustainable development requires change and compromise from all sides. Sustainable development is, in the words of David Yencken, the President of the Australian Conservation Foundation, "an inspired way in which a bridge can be built between two conflicting paradigms, between the paradigm that has underlain past Western approaches to the environment and an emerging new environmental paradigm" (Yencken 1994, p.221).

It is possible, in fact, to find several hundred definitions of sustainable development in the literature. The important point to note, though, is that all definitions - whatever their source serve particular social and economic interests and that they need to be critically assessed. However, while definitions of sustainability do vary, at the heart of sustainable development is the goal of reducing the impacts humans make on the earth - or as the Brundtland Commission defined it: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987, p.43). It is a matter of strategy, not ends.

The Brundtland Commission made another important point about sustainable development. This is a point that has been made many times by countries from the South: environmental objectives are important in their cultures - often far more important than they have been in the North - but the poverty and suffering of many of their peoples must be addressed also. According to the 1996 Human Development Report from the United Nations Development Program, poverty in the South is so widespread that the 358 richest people in the world have the same combined incomes as half the world's population. Thus, many in the South say that environmental objectives which exclude development goals, and thereby limit their potential to raise their material standards to those of the North, are unacceptable.

What we need as environmental educators are some conceptual tools for analysing different propositions about sustainable development. One such tool is the Venn diagram in Figure 1 where we can see that that sustainable development encompasses a commonwealth of social, economic and environmental goals in which environmental, economic and justice imperatives equally define the parameters of sustainable development. Purely technocentric, anthropocentric and ecocentric approaches to sustainability do not do this, as seen in the following intersections on Figure 1:

- *The technocentric environmental management view* - at the intersection of economic and environmental sustainability?
- *The ecocentric limits to growth view* - at the intersection of environmental and social sustainability?
- *The anthropocentric growth with equity view* - at the intersection of economic and social sustainability?

At the centre intersection is the *sustainable living view* which encompasses environmental, economic and social sustainability in the concept of sustainable development. The "sustainable living" view of sustainable development recognises the priority to bracket ecological sustainability with a genuine concern for social justice. A focus on "sustainable living" sees sustainable development as a process that influences the manner and rate of resource use by one group of people so that their consumption habits do not jeopardise the environment and well-being of people in other parts of the world, or destroy the capacities of future generations - in any part of the world - to satisfy their reasonable needs and wants. This requires a global perspective in environmental matters. This is what the environmental credo to "Think globally, Act locally" really means.

When it was planning the second World Conservation Strategy which was published under the title of *Caring for the Earth*, the IUCN, UNEP and WWFN tried to avoid the debate over the meaning of sustainable development. In its place, they coined the term, "sustainable living", and proposed that governments, industry and families need to live by a new world ethic of sustainability. This ethic (below) contains eight values which, at least for me, define a comprehensive set of criteria for sustainable development - and provide a central focus for environmental education. In summary form, these eight values fall into two groups - those related to our responsibility to care for nature (or ecological sustainability) and those related to our responsibility to care for each other (social justice). Four values may be identified in each group:

### People and nature: Ecological sustainability

*Interdependence* : People are a part of nature and depend utterly on her. They should respect nature at all times, for nature is life. To respect nature means to approach nature with humility, care and compassion; to be frugal and efficient in resource use; to be guided by the best available knowledge, both traditional and scientific; and to help shape and support public policies that promote sustainability.

*Biodiversity* : Every life form warrants respect and preservation independently of its worth to people. People should preserve the complexity of ecosystems to ensure the survival of all species, and the safeguarding of their habitats.

*Living lightly on the earth*:: All persons should take responsibility for their impact on nature. They should maintain ecological processes, the variety of life, renewable resources, and the ecosystems that support them. They should use natural resources and the environment carefully and sustainability, and restore degraded ecosystems.

*Interspecies equity* : People should treat all creatures decently, and protect them from cruelty and avoidable suffering.

Figure 1: Sustainable development as a commonwealth of social, economic and ecological values (Fien and Trainer 1993)

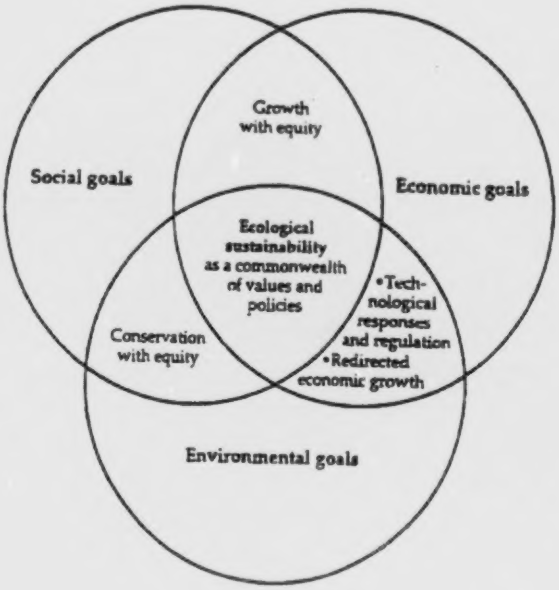
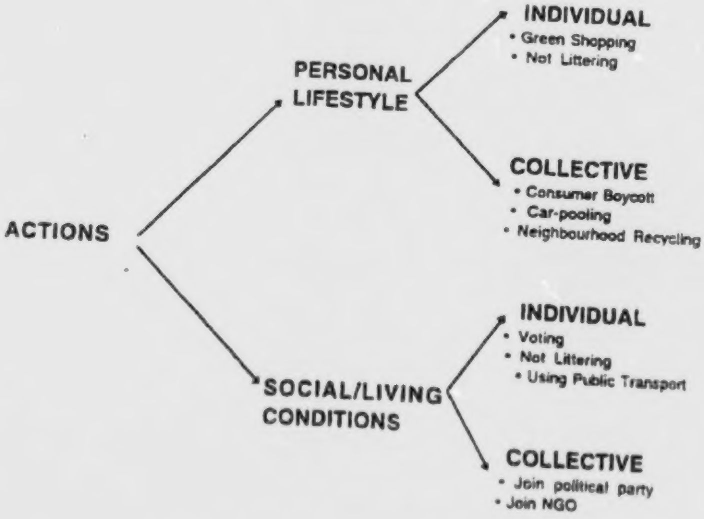

Growth with equity
Social goals
Economic goals
Ecological sustainability as a commonwealth of values and policies
•Technological responses and regulation
•Redirected economic growth
Conservation with equity
Environmental goals

Figure 2: Levels of action in environmental education (Jensen 1992)


ACTIONS
PERSONAL LIFESTYLE
INDIVIDUAL
• Green Shopping
• Not Littering
COLLECTIVE
• Consumer Boycott
• Car-pooling
• Neighbourhood Recycling
SOCIAL/LIVING CONDITIONS
INDIVIDUAL
• Voting
• Not Littering
• Using Public Transport
COLLECTIVE
• Join political party
• Join NGO

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**People and people: Social justice**

*Basic human needs* : The needs of all individuals and societies should be met, within the constraints imposed by the biosphere; and all should have equal opportunity for improving their lot.

*Inter-generational equity* : Each generation should leave to the future a world that is at least as diverse and productive as the one it inherited. To this end, non-renewable resources should be used sparingly, renewable resources should be used sustainably, and waste should be minimised. The benefits of development should not be consumed now while leaving the costs to the future.

*Human rights* : All persons should have the fundamental freedoms of conscience and religion, expression, peaceful assembly, and association.

*Participation*:: All persons and communities should be empowered to exercise responsibility for their own lives and for life on earth. Thus they must have full access to education, political enfranchisement and sustaining livelihoods; and they should be able to participate effectively in the decisions that most affect them. (Adapted from IUCN, UNEP and WWFN 1990 p.22; Fien 1993)

A centrally important set of questions and issues arise when the implications for environmental education of the world ethic of sustainability and the concept of sustainable living are considered. As Mrs Brundtland outlined, the nature of the transition required for sustainability, and the role envisaged for environmental education by the World Commission require a fundamental rethinking. Thus, in 1991, she wrote:

> Teachers play a very important role in the transition between generations, in the knowledge from one generation to then next. Consciousness-raising is vital for change. Teachers can convey to children a sense of respect and responsibility for nature and for the global environment .....
>
> But respect for the environment alone will not be enough to save our common future. A sense of solidarity with the world's underprivileged will be equally important. There is no way we can win the battle to save the global environment unless we deal squarely with the issue of world poverty. We must teach the next generation the necessity of caring for the poor and the dispossessed. (Brundtland 1991, pp.4-5)

I would like to explore these implications of education for sustainability with reference to our work as environmental educators. But, first, there are two caveats. First, the implications I will identify are at the level of principle. There are many workshops in the conference program that apply these principles. Instead, my aim is to try to tantalise you with a broad framework of principles to consider and then make your own decisions about. Second, I am going to make reference to the limits of nature-based environmental education. I hope you will not take this too personally. It was as much a threat and challenge to me when I started thinking about these issues as it may be to you. My first degree was in geography and my favourite area was biogeography. Rainforest walks and botanic gardens are among my favourite haunts - but, like you I am sure, I am also moved by the sight of beggars on the streets of our cities whether they be Melbourne, London or Bangkok. I am also torn apart by the sights of starving children and fear stricken refugees in television reports. And I am appalled by the sights, smell and sounds of traffic congestion in our cities; no matter how well funded our public transport is, it is never anywhere near that of the subsidies to private transport.

From these confessions aside, I would like to identify three implications for environmental education about which I would like to invite you to "Stand Up and be Counted". These are:

1. the need to expand the ecological foundations of environmental education to incorporate a social ecology perspective;
2. a review of the definition and purposes of environmental education; and

3. a review of the place of nature study and individual behaviour change in environmental education - and it is in this latter point that I will tempt you to throw over what I believe are three of the myths of contemporary environmental education.

## Social ecology foundation for environmental education

Ecology has been described as the foundation discipline of environmental education; Hungerford, Peyton and Wilke (1990) write of the "ecological foundations of environmental education". However, an example of two approaches to teaching about biodiversity illustrate the limitations of such foundations.

Biodiversity is one of the central concepts of environmental education. It is also one of the values in the world ethic of sustainability. Traditionally, this is what is usually taught about biodiversity in environmental education:

> During the next 20 to 30 years, the world may lose many thousands or even hundreds of thousands of species of plants and animals - primarily because of environmental changes due to human activities. The list of lost, endangered and threatened species includes both plants and animals. About 10% of temperate region plant species and 11% of the world's 9000 bird species are at risk of extinction. In the tropics, the destruction of forests threatens thousands of species which live nowhere else.
>
> Australia, for example, has lost 75% of its rainforests and 40% of total forest cover since European settlement 208 years ago. Nearly 70% of all native vegetation has been removed or significantly modified, and the rate of clearance is accelerating, with as much land cleared during the last 50 years as in the previous 150. Native vegetation is still being cleared at the rate of over 600,000 hectares per year which is almost half the rate of clearing in Brazilian rainforests in 1990-91.
>
> A rate of extinction of this magnitude is alarming and poses a global problem which has kindled world-wide interest in "biological diversity" or "biodiversity". Biodiversity implies more than simply the number of species that inhabit our planet. The ecological interactions among these diverse species and their physical environment make up the ecosystems upon which the human species depends for survival .....
>
> Biodiversity provides vital services such as renewing the earth's atmosphere, absorbing pollution and maintaining soil fertility. It provides ethical and spiritual inspiration for many societies. Biodiversity also provides the basic biological complement for the expression of coral reefs, forests and wetland ecosystems which help in fixing carbon from the atmosphere, an important and fundamental means of controlling greenhouse warming. (Hillig 1993; Department of the Environment, Sport and Territories 1996)

There are fundamentally important concepts in such teaching, and much good work is being done to bring people to an understanding of them. However, when guided by the concept of sustainable living and the full set of values in the world ethic of sustainability, we need to expand our teaching about biodiversity. Tolba, the former Director-General of UNEP, gave us a clue to what we should also consider when he wrote:

> Poverty is locking the people of the Third World into a dismal cycle of events; in their efforts merely to meet needs of food shelter and heat, they are being forced to destroy the very resources on which their future survival (and the future prosperity of all) depend.(Tolba 1987)

Thus, in teaching about biodiversity, we need to also consider the following social, political, historical and economic concepts:

> Developed countries are relatively poorer in biodiversity because they have gained their current quality of life at the expense of their biodiversity and in most cases at the expense of the biodiversity of developing countries. Should those countries which have not yet reduced their biological resources stop development based on the direct exploitation of biodiversity store houses because it impairs their longer term economic development? How should the cost of preserving biodiversity for the globe be shared between the rich and the poor countries? Environmental education must address questions of this nature as well as the biological components themselves.
>
> While biodiversity is basically an ecological topic, biodiversity problems and issues are connected to every fabric of our global society .....
>
> Not everyone in the world can afford to value the environment and needs of future generations may vary highly. It will be difficult to develop positive attitudes and conserving behaviour towards the natural environment among many poverty-stricken citizens of developing nations. Without food for survival, there can be little thought given towards conservation of the environment for future generations .....
>
> The motivations provided by poverty, starvation and ill-health cannot be changed merely by education about environmental quality. (Hillig 1993)

This means that development education, and the associated concepts of human rights, peace and democracy, must become a key element of environmental education. The themes of development and human rights means that we need to see environmental education in a broader context which even affects our definition of the environment and environmental education.

## Towards a definition of education for sustainable living

This redirection of the ecological foundations of environmental education towards social ecology provides the basis for a second way of exploring the implications of education for sustainable living for environmental education. This involves a broadening of the concept of environment and environmental education and their direct links with issues of development, human rights and peace - and, therefore, aligns environmental education as an integral partner with development education, human rights education and peace education in education for sustainable living. The World Conservation Union (IUCN) has described this new direction for environmental education as "education for sustainable living". The IUCN Commission on Education and Communication (1993) defined this as a process which:

> ..... develops human capacity and creativity to participate in determining the future, encourage technical progress as well as fostering the cultural conditions favouring social and economic change to improve the quality of life and more equitable economic growth while living within the carrying capacity of supporting ecosystems to maintain life indefinitely (p.6).

This is not an unproblematical definition. Questions may be asked about the meaning of "technical progress" and ways in which "carrying capacity" may be defined and measured. However, the definition does indicate that education for sustainable living has a futures orientation and seeks to develop the creativity and action capacities of individuals and societies with a view to bringing about the social and economic changes that can foster equitable and appropriate growth and ecological sustainability. In so doing, the definition avoids the ambiguity of many definitions of sustainable development that have concerned environmental educators (e.g. Jickling 1992) and the focus on individualism and behaviour modification that underlie unproblematical conceptions of environmental education (for a critique of these, see Robottom and Hart 1993).

The British Environment, Development, Education and Training Group's report, *Good Earth-Keeping: Education, Training and Awareness for a Sustainable Future* also avoids these problems of ambiguity and individualism when it offers the following as a definition and set of objectives of "education for sustainability":

We believe that education for sustainability is a process which is relevant to all people, and that, like sustainable development itself, it is a process rather than a fixed goal. It may precede - and it will always accompany - the building of relationships between individuals, groups and their environment. All people, we believe, are capable of being educators and learners in the pursuit of sustainability.

We argue here that eduction for sustainability is a process which:

- enables people to understand the interdependence of all life on this planet, and the repercussions that their actions and decisions may have both now and in the future on resources, on the global community as well as their local one, and on the total environment;
- increases people's awareness of the economic, political, social, cultural, technological and environmental forces which foster or impede sustainable development;
- develops people's awareness, competence, attitudes and values, enabling them to be effectively involved in sustainable development at local, national and international level, and helping them, to work towards a more equitable and sustainable future. In particular, it enables people to integrate environmental and economic decision-making;
- affirms the validity of the different approaches contributed by environmental education, and development education and the need for the further development and integration of the concepts of sustainability in these and other related cross-disciplinary educational approaches, as well as in established disciplines. (Sterling/EDET Group 1992, p.2)

## CHALLENGING CONTEMPORARY ASSUMPTIONS

The expanded conception of environmental education in education for sustainable living poses many questions and challenges for those of us who like to work out of doors and see nature study and experiences in nature as central to our work as environmental educators. I would like to focus on this point for a minute. It has led me to believe that three of the central rules of teaching I was taught as a young environmental educator are possibly myths. These are that:

- Environmental education is a part of progressive child-centred education.
- Environmental educators should be objective on matters of values.
- The goal of environmental education is to create environmentally responsible behaviour.

### Myth 1. Environmental education is a part of progressive child-centred education.

Nature-based work has given us many wonderful experiential teaching methods and has lead to many innovations in environmental education teaching methods and materials, e.g. environmental interpretation, nature trails, sensory walks, magic spots, Earth Education, Project Learning Tree, Project Wild, and so on. It has also lead to the humanisation of environmental education and helped us to provide learning experiences, especially in the outdoors, which give students self-confidence and esteem, and a sense of oneness with nature.

However, our new understanding of the scope of education for sustainable living alerts us to several dangers in this if this is the *only* approach to environmental education that we provide. First, it ignores the questions, issues and problems facing the student and her community. That is why I have been so pleased with the community outreach orientation of Landcare Education programmes. Focusing student attention on nature *without* a focus on wider social and economic contexts can direct students to look inwards rather than outwards to the links between nature, the individual and society. Also, we must be careful that nature experiences do not become escapism. It is often argued that close contact with nature can help students to develop a strong personal bonding with the earth and, therefore, increase their desire to act for it. However, it is difficult to see how this romantic view of nature will automatically lead to this result without a degree of political conscientising as well.

The focus on personal development and nature experiences are characteristics of New Age thinking. However, this philosophy tends to over-emphasise the importance of personal transformation at the expense seeing personal and broader social transformation as interdependent and to ignore that the journey to sustainability requires both for sustained social change. Mary Mellor (1992) warns that the focus on the individual in this approach to environmentalism may prove to be less helpful than its advocates intend:

> The problem in New Age thinking is the relationship between personal transformation and wider communal change ..... While I would not want to argue about the development of a spiritual dimension to our lives and a displacement of the emphasis on materialism, ..... it risks diverting us into an inappropriate self-obsession. While this may help us individually to develop a wider spiritual awareness and 'bring together' parts of ourselves that have become divided in modern society, it will not necessarily lead to any wider social transformation. That must be done by transforming the materialism of our culture, not running away from it. In many ways New Ageism can be seen as just another manifestation of the 'me' generation: a movement for the powerful, not the powerless. (Mellor 1992, pp.46-47)

Thus, the Danish health and environmental educator, Bjarne Bruun Jensen (1992) notes that both environmental and the New Age aspects of nature based education run the risk of romantic escapism - the first into romanticism with nature; the second into romance with oneself - and that neither can effectively solve environmental problems. Jensen goes on to say, "This does not mean that such activities cannot have value in themselves or for other purposes, but they do not solve the paradox of increasing anxiety and the currently increasing action paralysis" of the modern world.

**Myth 2. Environmental educators should be objective on matters of values**

I never really believed my lecturers when they said that we must be neutral and objective in environmental education. That message seemed to be at odds with the objectives of environmental education which emphasise developing a sensitive and caring environmental ethic. How can you develop an environmental ethic when you are supposed to be neutral, and telling students that all points of view are acceptable, and they just have to carefully analyse the viewpoints of others and then clarify their own values?

There is a fundamental contradiction in the values relativity of this position. If all values are equally valuable, then all values are also equally valueless.

Education for sustainable living is based upon the eight values in the world ethic of sustainability, and I would like to suggest that direct teaching for these values is a responsible professional decision. As O'Riordan (1987: 2) argues:

> Radical environmental education has a philosophy, content and methodology that is trying to influence the attitudes and values of society so that care and justice are integral elements of human behaviour out of which will inevitably come a careful treatment of the world's resources.

The case for teacher neutrality does not appreciate that school curricula and practices reflect dominant patterns of power and control in society or that the ideological function of the curriculum (both hidden and overt) means that schools cannot avoid inculcating particular values. It also ignores the explicit anti-environmental values that underlie schooling (Trainer 1990, 1991, Fien and Trainer 1993) and the very values that are inculcated through pluralist values education strategies such as values clarification and values analysis (Stradling, Noctor and Baines 1984). As a result, the literature on values in environmental education has tended to ignore recent theorizing over the nature of moral thinking (Hare 1981), justice (e.g. Rawls 1971) and collective social responsibility (e.g. MacIntyre 1981) and their place in democratic societies (Timmerman 1986). Trapped within its own liberal ideology, this literature has not sought to reconcile the case for directly teaching the values that underlie an environmental ethic with the case for teaching students how to reflect on the dilemmas posed by the conflicting values and how to clarify their own attitudes to particular environmental issues (Benniga 1988, p.417).

Thus, Huckle (1980, 1983) has argued that the liberal position on values education - that students should be taught *about* the range of values in any situation and how to clarify their own position in relation to them - must be extended to include the direct teaching of particular values within an atmosphere of free and critical discussion. As Giroux (1981, p. 359) argues:

> ... students must learn not only how to clarify values, they must also learn why certain values are indispensable to the reproduction of human life.

The values to be promoted in this manner include the substantive or terminal values related to environmental ethics, social equity and democratic procedures as well as cultural universals such as truth and honesty. This approach to values education has been labelled "committed impartiality" by Kelly (1986). According to Kelly, committed impartiality entails two beliefs:

> First, teachers should state rather than conceal their own views on controversial issues. Second, they should foster the pursuit of truth by insuring that competing perspectives receive a fair hearing through critical discourse (p. 130).

Teaching through committed impartiality involves a number of ethical responsibilities which have pedagogical implications. For example, Kelly (1986, p. 130) has outlined five conditions for "teacher disclosure" which safeguard students from unethical teaching practices:

1. Teachers' views should be consciously included rather than avoided in the discussion of controversial issues.
2. Teacher disclosure of personal views should represent a positive ideal of, and model for, committed and responsible citizenship.
3. Teachers should disclose their views openly and unashamedly and not consistently disguise or diminish them through devil's advocacy or repeated qualification.
4. The timing, mode and tone of disclosure involve professional decisions that can only be made by individual teachers with regard to individual classes and students.
5. The disclosure of teachers' views should be done judiciously and with due regard to the imperatives of impartiality and critical discourse.

Kelly summarizes the pedagogical implications of these principles in this way:

> To recommend that teachers state their personal views on issues does not mean, however, that ... they repeatedly attempt to convince students of the superiority of their own positions. To the extent that teacher disclosure becomes heavy-handed advocacy, it may reasonably be perceived by students as propaganda or psychological intimidation. In either case, the norm of impartiality would be undermined (pp. 130-131).

Kelly suggests that teachers need to adopt "a set of strategic correctives" in order to adhere to the imperatives of impartiality. His suggestions include: praising reasoned oppositional viewpoints, publicly engaging in self-critique, and encouraging students to critique their points of view whilst critiquing students who merely parrot them (p. 132). These guidelines are supported by Huckle (1985, p. 303) who stresses the importance of "commitment to truth as a duty" and Richardson (1982) who argues that teachers have a duty to protect their students from their own power of persuasion by allowing space for doubts and differing viewpoints. Thus, Harris (1990a, 1990b, 1990c) argues that while teachers have a responsibility to "intervene" in the ideological formation of the young, to help them to resist the hegemonic influences of dominant culture, they should not impose their views on students. Instead, he recommends the critical pedagogy of "making schooling into a site which develops skills for critical reflection and action in the struggle to overcome injustice and social inequity" (Harris 1990a, p. 179).

### Myth 3. The goal of environmental education is to create environmentally responsible behaviour

Many curriculum documents and journal articles, especially from the USA, begin with the assumption that the goal of environmental education is to create environmentally responsible behaviour (Hines, Hungerford and Tomera 1986). And they are correct - to a point. Responsible environmental behaviour is a necessary, but nonetheless insufficient, purpose of environmental education. A sustained case has been made against the responsible environmental behaviour movement in environmental education (see Jensen 1992, Hart and Robottom 1993). I would like to pick up on two of the points that are made.

First, responsible environmental behaviour is defined in narrow individualistic terms which ignore the many types of actions needed to solve environmental problems - and even to live in an environmentally responsible way. The focus on responsible environmental behaviour addresses only the top line examples of actions in Figure 2. This is fine for the happy beneficiaries of economic development - but it ignores the individual and collective actions needed to create a sustainable world. Education for responsible environmental behaviour fits the old, narrow pre-Rio view of environmental education and fails to address the imperatives of sustainable living.

Second, the teaching methods advocated for developing responsible environmental behaviour are behaviouristic. They are based upon a linear view of the relationship between knowledge, attitudes and behaviour and the assumption that "right knowledge" and "right attitudes" leads to "right behaviour". To be told what these are may lead to environmentally responsible behaviours in the short term. However, behaviouristic approaches to environmental education do not create the critical thinking skills necessary to develop action potentialities for the long term. Indeed, I am not sure that they work in the short term with young people, either. I do not know how effective the anti-littering campaigns are in your city but I suspect that they are similar to those in Queensland - and other behaviour modification campaigns, such as anti-smoking and anti-drinking - which are seen as irrelevant by many young people to their real needs and interests.

Alternative approaches based upon developing the critical thinking, reflection and action skills needed to make life-long decisions about the nature of a better world and the relationship between oneself, the biosphere and other people, at local, national and global scales, require a refocussing in environmental education away from responsible environmental behaviour to education for political literacy - for active and informed citizenship.

### Conclusion

In this paper, I have sought to make a case for a broadening of the agenda of environmental education by teasingly outlining what I believe are three myths in contemporary environmental education. I have also explored the trends that have given rise to a conceptualisation of environmental education for sustainable living and its integration with development education, peace education and human rights education. I have explored some of the implications of this for classroom content (through the example of traditional and newer approaches to the topic of biodiversity) and asked us to think beyond nature study as our focus in environmental education.

Those of us who accept the challenge to "Stand Up and be Counted" on issues of sustainability and education for sustainable living may not find it that easy, however. We may need to convince our supervisors why we need to be involved in social issues in the community - in order to show how conservation goals cannot be achieved without attention to values of appropriate development, human rights and democracy as work. We may need to explore the way the principles of sustainable living operate in our schools and workplaces. Are they community demonstration models not only of ecological sustainability and conservation principles, but also places where the buildings and the products we use model the principles of appropriate development? And do management and personnel practices model the principles of social sustainability, human rights, and equal opportunity and outcomes for all employees? It may be that our first task in education for sustainable living is the education of our colleagues and supervisors. It certainly is for people like me who work in Universities and Colleges.

Giroux (1988) argues that this may be done by educators living and working as "transformative intellectuals". Central to the task of being "transformative intellectuals" is recognising the "necessity of making the pedagogical more political and the political more pedagogical". Making the pedagogical more political means consciously working with others to foster democratic values and a deep and abiding faith in the struggle to overcome economic, social and ecological barriers to sustainable living, and to further educate and humanise ourselves as part of the struggle. Making the political more pedagogical means applying the principles of education for sustainable living in developing learning experiences that encourage our groups to enquire into ways that they can become part of the transition to sustainability - and not just knowledgeable about biodiversity, as important as that is as a starting point.

Working as a transformative intellectual requires that we "Stand Up, Stand Up and be Counted".

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# Learning through Landscapes: the importance of school grounds

Bill Lucas
Director of Learning through Landscapes
Third Floor, Southside Offices, The Law Courts, Winchester SO23 9DL UK
Telephone (01962) 846258. Fax (01962) 869099. Email: charity@tcp.co.uk

*This paper forms the basis of my key-note address on Friday 17 January 1997. The speech will be illustrated with a double-slide presentation of more than a hundred images of young people outdoors at school and the contents of these cannot easily be "transcribed". The sections dealing with the formal, informal and hidden curriculum - the rationale for this work - rely on these slides. These are, therefore, artificially short in this written version.*

## Abstract

School grounds are some of the least child-friendly environments all over the world. They are critically important childhood environments and have a profound impact on the young people who spend so much time in them. Learning through Landscapes (LTL) is a UK charity which addresses all aspects of school grounds and which has shown how they can be transformed for the benefits of children. LTL publicises, researches, advises, trains and lobbies hard for school grounds on a national and international stage. School grounds are an outdoor classroom. They offer huge scope for play and social interaction. How they are used and managed gives out strong messages to young people about ethos and values. In school grounds children can learn at first hand about the natural world. Learning through Landscapes is a philosophy and an approach to a process of development. This process is holistic, sustainable and requires the full participation of young people and the wider school community.

## Keynote address:

"When torturers wish to disorientate their victims, they frequently create a featureless environment in which to place them."(1) This school is very, very interesting and we're very happy here"(2) Believe it or not these two contrasting quotations refer to the same environment - school grounds. The first is taken from a provocative article I wrote for Health Education Journal in 1992 along the lines of "school grounds can seriously damage your health". The second provokes in a different way. It is the voice of a very happy child at a school with grounds which have been developed into an exotic wonderland of greenery and activity.

I wonder what the grounds of schools in Australia are like. In the United Kingdom there are 30,000 of them and they cover about 150,000 areas of land. While too many still resemble the prison yard, this is changing. Over the last decade, there has been a quiet revolution taking place in thousands of UK schools as a result of Learning through Landscapes. I was aware of various initiatives to develop school grounds in Australia, such as the Victorian Schools Nursery Project, and have learned of many more this week. I suspect that many Australian schools are not unlike the negative British stereotype with which I began - largely asphalt, treeless, featureless, without much seating or shelter and virtually devoid of wildlife or aesthetic stimulation. Even if your local school is different you will, at least, recognise my unflattering portrait of this childhood environment.

In this presentation I will be sharing good practice from the Northern Hemisphere with you I hope to also stimulate you into wanting to establish new initiatives with us in the UK. As some of you may be aware, my visit is very appropriately, being sponsored by the British Council in Australia as part of its new images, "Partnerships for Excellence" initiative.

Let me start by provoking you with some facts about school grounds which seem not to be widely enough known. Then let me touch on some initiatives in Sweden, Canada, the USA, and Japan and end by exploring work in the United Kingdom which has led LTL to develop its rationale. As the main part of my presentation, I will offer you a rationale for using and developing school grounds. It is currently being put into practice by thousands of schools in Britain. I shall be using slides to tell my story and advance the cause of this aspect of environmental education. The benefits of school grounds work are extraordinary. They have already enabled us to convince the UK government. Finally I will tell you a little bit about Learning through Landscapes (LTL, as we are increasingly known) and extend an invitation to you to join with us internationally in promoting the importance of school grounds.

But let me give you some interesting facts. How many of these statements trip readily from your tongue?

- School grounds are the one external environment to which all children have regular access.
- For most children, school grounds are the first public outdoor space of which they have any sustained experience.
- For some children, school grounds are the only outdoor environment to which they have regular access.
- Whether or not school grounds are used for teaching, children may spend a quarter of their time at school in them.
- Much of the curriculum can only be effectively taught outdoors.
- The way school grounds are designed and managed has considerable influence on children's behaviour and attitude.

I could go on. But I would prefer to make a more intelligible case by offering you a rationale rather than relying on truisms such as these

Before I do this, however, let me offer you an international context to this area of work. In the last five years there has been an explosion of interest. Sweden has set an organisation, Skolans Uterum, with support from the Swedish government to help schools and hold conferences to raise awareness. In Canada, the Evergreen Foundation has taken a strategic approach to the opportunities of naturalising the school estate across Canada. It is establishing a network of key support staff and promoting imaginative projects. Japan is attempting to introduce more teaching outdoors and has translated the Outdoor Classroom (3) into Japanese. In the USA there is a serious exploration of two issues, children's participation and the role of horticulture. Roger Hart, at City University in New York is an acknowledged pioneer in the first of these two areas and there is a growing number of organisations, including Botanical Gardens, the Montessori Foundation and the American Horticultural Society interested in turning school grounds into gardens. This is, of course, a very limited summary of a few initiatives and does not include work currently being undertaken in Australia.

Perhaps the most powerful indication of global interest in school grounds is the creation of international school grounds day. Last year, thousands of schools and organisations took part. This year the date is 2nd May and I hope that Australia will be well represented.
There are three elements to the rationale developed by LTL. Schools can use their grounds :

- through the formal curriculum - the outdoor classroom;
- through the informal curriculum - the experiences which are offered during break and lunchtimes;
- through the hidden curriculum - the messages and meanings which children read from the ways in which their school's grounds are used, designed and managed.

In addition, there are extra-curricular and community opportunities which most schools will want to consider.

The formal curriculum. An obvious use of the school grounds is to extend the teaching area beyond the confines of the classroom. The grounds are a rich resource for learning right on a school's doorstep. There are many possibilities in science, English, mathematics, geography, history, design and technology, art and physical education. There are possibilities for the teaching of skills such as observation, communication, classification, estimation, surveying, analysis, comparison, design, investigation, mapping and recording. Broader issues related to environmental education and health can also be learned.

While undeveloped sites can be used for some teaching activities, a greater variety of opportunities for teaching will be presented on a more developed site. A pond may provide a resource for teaching about life processes and living things in science or about contrasting environments in geography, while at the same time providing a real context for using and applying mathematics. An understanding of the range of opportunities inherent in certain features will lead schools to consider those which meet their needs in a number of areas of the formal curriculum.

School grounds gives access to what has been termed the "natural curriculum". Plants, animals and soils can only be investigated thoroughly if pupils have direct experience of natural habits. Changing weather conditions, the rotation of the seasons and the processes of growth and decay can provide a constantly changing context for learning. Indeed, the grounds can make a unique contribution to the development of an understanding of the natural world and the principles of biodiversity and sustainable development.

One powerful aspect of the learning process for which the grounds are eminently suited is the provision of first-hand experience - letting pupils learn by seeing and experiencing for themselves rather than relying on textbooks, worksheets and the teacher's exposition. The grounds make available particular resources which cannot easily be reproduced in the classroom. Existing good practice in many schools and guidance provided by the UK's School Curriculum and Assessment Authority, especially Teaching environmental matters through the curriculum, supports this view. LTL was involved as a Consultant in producing this document which is, not surprisingly, full of case studies of work in schools grounds!

The informal curriculum. At least a quarter of children's school day is taken up with break and lunch-time. The term informal curriculum is now widely used to describe the times of day when children are in school but not involved in lessons, like lunchtime, as well as what they do at those times, for example, play and recreation. Much of this time, weather permitting, is spent outside. This time is part of the school day and part of children's education. During this informal element much important learning takes place.

Play is a complex subject and its significance is not always understood. It is sometimes confused with amusement, diversion or simply "letting off steam". It involves learning about the self, about other people and about the environment. It is essential to healthy human development. It is a process of doing, of exploring, of discovering, of failing and, of course, of succeeding. Play in school is different from play in a park because it is supervised and because of the environment and educational context of school in which it takes place.

What children can do at playtime is largely determined by the design and management of the school grounds. Even the most imaginative child will find it difficult to be creative and sociable in a bleak, sterile, largely tarmac place. The grounds need to provide diversity of places and habitats so that children have the maximum opportunity for interaction with other young people and other places.

It is important for schools to understand issues connected with the use of space - the degree to which football dominates some playgrounds is one obvious issue - and the ways in which it can be most effectively managed.

It is not just at primary school level that play is important: older pupils need opportunities for informal recreation which need to be addressed.
The hidden curriculum. Whether or not school grounds are well used, their very existence affects and influences pupils, staff, parents and the wider community. Research has shown that the messages conveyed by the nature of the school grounds, what may be called the hidden curriculum, are very important.

The hidden curriculum of school grounds is a concept which was introduced by LTL in 1989 and developed in Special Places; Special People (5). The research suggested that a school's grounds are essentially signifiers of its ethos.

The main findings of this research will help schools to understand the complexity of the issues surrounding the use and development of school grounds. They are:

- School grounds, as external environments, have become increasingly important to children in modern society.
- School grounds, by their design and the way they are managed, convey messages and meanings about the ethos of schools to children which influence their attitude and behaviour.
- Children read these messages from a range of signifiers. These frame the cultural context of the environment and constitute the hidden curriculum.
- The hidden curriculum has considerable influence, in a range of subtle but significant ways, on the operation of all schools.
- It is within the power of those who manage schools to determine the nature of the hidden curriculum of their grounds.

The actual nature of school grounds developments - new features, new design or new management solutions are, of course, of immense benefit. It is the process of development, however, which causes the most wide ranging changes. It is this which can have most impact on the ethos of the school, changing the hidden curriculum of its grounds and providing a value-added factor which surprises many schools.

But it is not so much what is done as how it is done which matters. Developing school grounds is an ongoing process. This process needs to be:

- holistic - involving the whole site, the whole community and all aspects of the curriculum;
- sustainable - involving consideration of the use, design, management and maintenance of school grounds as part of a school's development planning.
- participative - involving children with adults in as many aspects as possible.

Where the rationale is applied according to LTL's principles, schools report a number of benefits. These include:

- improved relationships between pupils and staff;
- improved relationships with parents;
- enhanced image and greater popularity with the local community;
- reductions in the incidents of bullying, accidents and vandalism;
- more effective teaching and learning;
- development of an ethos of care and a stronger sense of ownership;
- more efficient use of existing resources;
- a great deal of fun!

I will be using my slides to share some exciting new LTL research, specifically relating to older pupils the value of plants and young people with special educational needs. I will end with a passionate plea to all those present to view this precious childhood environment as a critically important one, one where, as the title of this conference suggests, young people can find powerful links to the earth wherever they are in the world.

# PRESENTED PAPERS

# Using A Multimedia Approach To Design An Environmental Education Package

**By Ingrid Albion**
**Education Officer**
**Parks and Wildlife Service,**
**GPO Box 44A Hobart 7001 Tasmania**

## SUMMARY

This paper explores the avenues used to develop an educational package designed to successfully pass on specific environmental education messages to a wide range of age groups on a limited budget.

The main target group for the threatened species educational kit was primary and secondary Tasmanian school students and teachers. Typically, such projects tend to be expert-guided. The aim of this project was to ensure that teachers and students had a large input into what information was provided in the kit and what form the kit itself took.

As many different types of schools as possible were included in the research. This meant the list had to include primary and secondary schools, government and non-government schools, religious and non-denominational as well as urban and rural schools. Local schools were visited and discussion groups with teachers occurred. A number of specific questions were asked concerning what information teachers felt was most lacking, what types of media they use (ie videos, slides, books, visuals, computers, notesheets,) and ways they would teach the topic.

Results indicated several factors or concepts in common. These are listed in some detail and resulted in the final kit form. The package includes a poster, an internet site and a self-contained folder with notesheets, worksheets, activities and graphics.

### Why the package was required

The task set by the Tasmanian Parks and Wildlife Service was to develop a threatened species educational kit particularly for use in primary and secondary schools. Threatened species was the choice of topic because this was one area our department was continually receiving requests for information about, yet lacked information on. In particular, requests came from school students, teachers and other environmental educators such as scout leaders and landcare groups.

The decision to develop such a kit was also very timely as legislation had just been passed for Tasmania's Threatened Species Protection Act 1995 and the new Threatened Species Unit was about to be established within the Parks and Wildlife Service. Also, the new curriculum profiles for Australian schools identified the need to teach threatened species within particular strands and levels. In December 1996 the threatened species education package was launched by Pegg Putt, MHA Denison, at the first Threatened Species Unit Workshop.

### What needed including in the package

The first step in this process was to research the topic to see what kind of information was available in the form of books, videos, internet, posters, plays, recovery plans and other sources. This gave the researcher a good general knowledge of the subject as well.

The next, and probably the most crucial, step was to research what was needed in local Tasmanian schools with respect to teacher and student requirements, curriculum profiles for different subject areas and technology and resources already available. This step was done with considerable attention to detail and as many school and teachers were surveyed as possible within the limited time available. This is a new method for our department, as previous kits were often expert-guided without a lot of input from teachers about what best suited their teaching methods.

One of the objectives of this step was to research as many different types of schools as possible. This meant the list had to include primary and secondary schools, government and non-government schools, religious and non-denominational as well as urban and rural schools.

Local schools were visited and discussion groups with teachers occurred. Some teachers were interviewed over the phone. All teachers and schools approached were keen to assist and offer advice. A number of specific questions were asked concerning what information teachers felt was most lacking, what types of media they use (ie videos, slides, books, visuals, computers, notesheets,) and ways they would teach the topic.

### What were the needs of environmental educators?

### Graphics:

Results indicated several factors or concepts in common. All primary school educators perceived posters or pictures of Tasmanian threatened species to be of high priority for inclusion in the kit. Pictures needed to be large, interesting, Tasmanian-orientated, with labelling of individual species. It was felt there was a lack of suitable pictures of Tasmanian threatened species available for schools. Most pictures of threatened species were of mainland or overseas species. It was possible for teachers to find some individual threatened Tasmanian species such as the thylacine, Pedder galaxiid and orange-bellied parrot. Teachers felt that an exclusively Tasmanian set of pictures which included species from as many different groups and habitats as possible would be of most use in the classroom.

Secondary school teachers felt graphics were important but many didn't give it quite the same high priority as primary school teachers. Those teaching Year Seven students were keen to have posters or large pictures whilst those teaching mainly higher Year levels, felt that computer graphics would be great. In general, the need for secondary school teachers to share their classrooms with other teachers as well as their own mobility of class teaching rooms made the use of posters more difficult.

### Ability to teach cross-curriculum:

Primary schools teachers felt that cross-curriculum information on the topic was of great importance, so that it could be taught in many subjects. The kit needed to be designed to enable educators to teach threatened species in such subject areas as history/social science, science, maths, art and English. This holistic approach to a topic is widely used in primary schools so that interesting subjects can be explored from a number of different angles. Ideas for each topic as well as helpful information was seen by teachers as very important. For this reason, graphs and tables of information were included in the kit, as were wordsearches, crosswords, debates and scientific activities.

The new curriculum profiles encourage cross-curriculum teaching, offering similar concepts for science and studies of society and environment (sose). Teaching the one topic in different subject areas at the same time can be more difficult to co-ordinate in secondary schools as teachers generally teach only one or two subjects. However some secondary schools do encourage this approach. For example, Sorell High School taught threatened species in science and art last year. Students designed stencils of individual, threatened animals in art which they then spray painted onto a large piece of calico. This was then hung in the science area where students were researching the biology of their own individual species.

### Case studies of local species:

All schools indicated that there was a great need for case studies and information on local Tasmanian species. Most teachers and students found it hard to access a lot of information and all were keen to find out about examples from their local area. Research indicated that there was no comprehensive kit of information specifically on Tasmanian threatened species, whereas information on overseas and interstate species was available through all media sources including CD roms, posters, books, videos and the internet. For this reason, the kit was aimed solely at Tasmanian threatened species and as far as possible, species were chosen which occurred in many different Tasmanian areas and very few which were specific only to national parks.

Secondary school teachers all felt that worksheets and activity ideas for specific Tasmanian species were necessary for the kit. Generally they wanted information and worksheets that could be photocopied for class use. Many secondary and some primary school teachers felt that information should be put onto either the internet, video or even a CD rom. They believed that this sort of information would be of particular use for individual and class assignments.

Very few teachers felt a slide kit would be of much use and indicated that slides were rarely used by class teachers. Generally slides are used by guest speakers and teachers felt this was a more appropriate use of slides. The development of a threatened species slide kit was seen as an important future resource to prepare for use by guest speakers but at present beyond the scope of this initial package.

**Providing a list of resources:**

Another common request was for a list of resources that teachers could access including books, internet sites, videos as well as people, groups or places they could visit or contact for specific advise. For this reason a long resource and groups-to-contact list was included in the back of the kit. Most school and other libraries had books on endangered species as well as Tasmanian flora and fauna. Books listed in the resource section were those that related to activities specified in the kit.

There is a myriad of contact groups available who have knowledge of Tasmania's fauna and flora. Many were listed as a first point of contact for teachers. This made for easy reference by teachers. It was important to choose groups from a number of different specialist areas including landcare and coastcare groups as well as identifying resources such as museums, wildlife parks and national parks.

The majority of teachers would also have liked some resources such as stuffed specimens, visitors with live animals or set of plaster of Paris footprints. The main problem with developing a resource such as slide kit, display or set of stuffed specimens was the administration system required. It would be impossible to monitor and loan out such a resource given the constraints on the Parks and Wildlife Service staff at present. The cost of setting up and running a collection of stuffed specimens plus other available items for lending was examined but seen as ineffective. Some attempt was made to address this request in other ways by linking schools with groups who may be able to provide such items including libraries, private individuals and experts.

**Analysis of different media**

An analysis was made of this research and alternative methods of producing this kit were examined. Costings were done for internet, CD roms, videos, posters, worksheets and notesheets.

CD roms were discarded as not feasible being too costly for the budget both in terms of time and money. It can easily take up to a year to produce one CD rom. They also have the drawback of being limiting with respect to updating the information and usage by schools. Once the information is written onto a CD it can not be changed, however threatened species is a very dynamic topic with status and numbers continually changing. This meant a CD rom would quickly become outdated if case studies of species were used. It may be that CD rom systems themselves become obsolete now that the internet is becoming available in schools.

Video was a possibility but the researcher felt it was more of an icing on the cake for any kit and should be saved for a future project on threatened species. Videos are used extensively in most schools although a few schools would only use them rarely. Students enjoy watching videos and they are a good educational tool. However videos are quite expensive to produce and would require the use of a professional camera person. It would be very difficult and costly to actually find and record many of our threatened species. Many of them are tiny plants and invertebrates. It would be important to get really good footage of plants in flower as well as habitat. However plants flower at specific times and much of this footage would be hard to get as well as time-consuming. There would also be a limit to the information and concepts which you could get across in one short video. The Service has just released a video case study of one of our threatened species - the forty spotted pardalote and it was felt the inclusion of another kit in this resource was not really a high priority as schools can access the pardalote video.

The final choice and best use of time, money and resources to provide the information most requested and needed, was seen to be a three-pronged approach to an educational kit. The kit was designed to consist of a folder of information, a poster and an internet site.

**A self-contained folder:**
The folder is self-contained and consists of information in the form of notesheets, worksheets, case studies and activitities. It was important that the folder be sent to every Tasmanian primary and secondary school, so that all teachers had access to at least one copy. Extra folders were made as teachers often wanted their own private copy. ,A small donation is required to cover the cost of putting an extra folder together. The sheets were specially printed so that each set was an original. This ensured the teachers could photocopy them successfully for class use. Each sheet was placed in a plastic slip so that teachers could easily remove and replace them for photocopying.

The folder is divided into various sections. Sections were chosen to represent various groups such as fish, minibeasts, birds, whales, animals and plants. These allow teachers to choose any group with which they have expertise or which best fits their program. For example, some teachers have a stronger botanical, marine or zoological background than others. Species were chosen with this in mind so that someone studying the marine environment can use the section on whales, marine pollution, fish (spotted handfish) and minibeasts (endemic seastar). Alternatively a teacher might only use the section on plants or the section on birds.

Each section of the folder can be taught in isolation, either as a starting point for that subject or as a complete entity. Alternatively teachers can start at one end of the folder and work through. The information can be adapted for primary or secondary schools to fit in with the curriculum profiles at different levels. The folder is not specifically numbered by page, only by section, as teachers tend to collect material about topics from a number of sources. This means they can simply place new or extra material into plastic slips and add it to the relevant section. It also means we can send out new or updated material to all schools to add to the folder as necessary. Already we have extra resources being prepared on bandicoots and swan galaxiids.

In the back of the folder is a copy of many of the Parks and Wildlife Service notesheets. Many simply refer to our wildlife and how people can live with wildlife. There are also some specific notesheets on our threatened species which give extra detail on their habitat, threats and biology. This sort of information is continually being added to and new ones can now be sent to schools to be added to the collection providing a great resource for teachers.

Graphics and cartoons were used extensively within this folder to provide both enlightenment and interest for students. Four friendly cartoon characters were developed to highlight information. Sammy the skink from Pedra Branca offers fun activities, Tas the devil sound environmental advice, Tawny frogmouth is the wise owl and Ernestine echidna alerts students to seek extra help from our new threatened species internet site (http://www.delm.tas.gov.au/esl).

Each section of the folder provides fascinating facts on individual species as well as that group in general. For example in animals there is a table showing how many Tasmanian vertebrates are: threatened, endangered, vulnerable, rare or extinct. There are case studies of two of our parrots, the swift and the orange-bellied, with specific activities and information relating to each. Concepts such as captive breeding programs are explored and actual data is recorded in the form of bar graphs. Activities are designed to enable all schools to participate including how to find out more about local birds in your local area. All the information is written and presented in such a way, that anybody could teach the topic whilst allowing those with expertise in the field of biology to utilise the facts and ideas and extend them as far as they like.

The final section within the folder lists groups-to-contact and other resources such as books and places to visit. These are divided into separate categories for ease of reference. There is also a short glossary of some of the more specialist terminology.

**Providing graphics**
A colourful poster identifying 21 Tasmanian threatened species was designed and also sent to each school. This was seen as a vital teaching aid for upper primary schools but also considered to be very useful for secondary students. Each species on the poster is identified by a common name and linked to one threatening process. Species were chosen to represent a range of habitat types as well as all groups of threatened species such as invertebrates, birds, mammals and plants.

Students and teachers were consulted on the choice of colour and information to be included on the poster. It was unanimously agreed that all the species must be Tasmanian and as large and as many as possible. All species chosen are included on the internet site so students and teachers can research them further. Interestingly, primary school students and teachers wanted very bright primary colours on the poster, whilst secondary teachers were happier with slightly more subtle colours. This was quite a contrast to the general viewpoint of other non teaching scientists who felt the poster was too bright at first.

As requested common names were linked to each species. However, to get away from the feel of just another pretty wildlife poster, each species was tagged with one of the threats to its survival. This allows students to not only identify individual threatened Tasmanian species but also to identify a threatening process.

The poster, internet and folder graphics were all bought simultaneously for use within the three-pronged package which saved on the costs of pictures. Wherever possible only the best quality pictures were used. As well as complementing the educational folder, the poster provided a useful saleable item and 2 000 copies were printed. This process was deemed more cost effective than producing a large number of individual species pictures for school use.

**Providing an internet site:**
The internet site fulfilled a number of needs not covered by the other media. The folder and poster were specifically designed for use by teachers and other environmental educators. The notesheets included in the folder are suitable for general public use and sent out whenever requested. However the internet could not only be used by school teachers and students but is easily accessible by many other groups. It is potentially, eventually available to all Tasmanians (through schools, libraries and the general workplace and even at home), as well as people from interstate and overseas. So the internet strongly fulfilled the need for general public education as well as for school use.

The internet site was designed particularly for school use. Research suggested that more schools would be coming online with the internet and it would also be possible to download this information onto a Syquest disk for other schools, in the interim period, if necessary. The internet site depicts nearly 40 Tasmanian species and all were chosen to provide maximum variety of species: within habitats, groups, threats and threatened category. High quality graphics were used so that students can click on pictures and get a large photograph of that species.

Up-to-date information was provided on each species, which can be continually updated over time. In fact since the site went live back in August, there have been several new updates. On December 14th 1996 an extinct Tasmanian snail was rediscovered at King Island and we were able to go live with this story before the media (television and newspapers). Species' conservation status and information are continually changing, so the internet site allows for quick modification. For example, there has been new information on the spotted handfish, swan galaxiid and eastern barred bandicoot since the site first went live.

The latest changes to this site include moving pictures as well as sounds. We have purchased some old thylacine footage as well as used video film of the forty-spotted pardalote and orange-bellied parrot. It is hoped that more footage will be incorporated into the site as it becomes available. There is also a short recording of the green and gold frog call. All these can only be accessed using netscape three and above, but provide students with greater interaction.

This was the first internet site for the Interpretation and Education Section. Developing this site opened pathways and inspired enthusiasm for further sites to be designed including a new World Heritage Area site and a general National Parks site. Links between these sites enable surfers of the net to potentially find out more about the habitat of some of our threatened species in protected areas. the number of hits on the threatened species site as well as the comments and email from all over the world, indicate the value of such a site. Many questions asked of our section by the general public can be answered simply by directing them to our internet site address. This saves on staff administration time as well on the use of resources. We hope to add all our notesheets to this site so that we can save on paper usage.

The internet site has been designed to enable teachers to set the whole class individual assignments. For example each student could research one of the forty species described to find out about its biology, habitat and threats. Alternatively students can explore all the marine threatened species, all the extinct or rare species, all the plants or all species affected by loss of habitat. There are inumerable permutations which students can explore on this internet site. Most of the species chosen, are those found outside our national parks. Many are from local areas so that as many students as possible can identify with at least one species from their area. For this reason a seastar from Eaglehawk Neck was chosen, along with the Tunbridge buttercup, Bruny and Maria islands' forty-spotted pardalote, Cremorne's Morrisbys gum and now King Island's snail.

**Conclusion**
This package is an excellent example of environmental educators working together and tapping into each other's expertise. It is hoped this package will be of great benefit to all Tasmanian teachers who wish to teach about Tasmania's threatened species. The poster and folder will be available in every primary and secondary school by the start of 1997 (if not already). The internet site provides a great interactive experience for students and their teachers as well as being an important source of information for anyone world-wide, interested in finding out about our threatened species. All parts of the package were designed to stand alone as well as complement the other parts. Each provides or fulfills a much needed requirement by educators.

# What Difference Can a Good Question Make?
# An Introduction to Strategic Questioning

Bobbi Allan & Katrina Shields
Social Change Training & Resource Centre
2 Terania St. The Channon 2480
Tel: 066 886 116 Fax: 066 886 157 Email: sctrc@om.com.au

## ABSTRACT

Strategic Questioning involves a special type of question and a special type of listening. It is a powerful and exciting tool for social and personal change. It is a significant service to any issue because it helps local strategies for change to emerge. Anyone can use strategic questions in their work and their personal lives to liberate friends, co-workers, and political allies and adversaries to create a path for change.

## INTRODUCTION

I have found the technique of Strategic Questioning to be a dynamic and creative tool in the repertoire of environmental change strategies. So many environmental problems have human causes, and strategic questions can help with the human side of things. We generally address environmental problems by providing information. However people need bridges between information and action. Strategic Questioning can provide that bridge. Basically it is the art of asking questions skilfully in a way that will provoke action or a different action.

Strategic Questioning is not a new discovery, many of the techniques and processes have been used in the field of counselling and therapy for some time. It's origins are diverse. Pioneers such as Milton Erikson refined the art of question asking as a therapeutic tool. We were introduced to the potential for these methods in the social change and environmental area by Fran Peavey. Peavey is an American activist who has also been one of the inspirations for Heart Politics conferences for activist from the book of the same name , .

I work, with Katrina Shields, in the Social Change Training and Resource Centre based in Northern NSW. Our purpose is to provide training, support and consultancy as well as resources to change agents and activists. We have been excited and gratified by the power of strategic questioning as a strategy to promote change and find that sharing these tools with people yields quite creative and empowering results. I believe strategic questioning could be a useful tool in environmental education, as an empowering method for adults and children alike, in finding responses to the environmental crisis we face.

## WHAT IS STRATEGIC QUESTIONING?

A strategic question is either a one-off question or series of prompts, which assist oneself or another create some motion, or yield something new, in situations that could become stuck or repetitive. Sometimes a simple enquiry at the right moment such as " What would it take for us to resolve this?" or "What are some other options?", or "What is your biggest dream about this issue?" or "What help so you need to take that on?" can liberate energy, exploration and creative responses. It is much more effective than our more usual conversational interactions of focussing on the problem (aint it awful sessions) or needing to jump in with our advice and opinions (which often produce oppositional reactions) or perhaps staying with the same old formulas for change that we usually apply without questioning wether this is the most powerful or useful thing we could be doing.

Some of the assumptions that strategic questioning is built on are from a sound educational and empowerment base, yet you have to acknowledge they are not often practised. It assumes that people are much more likely to act if they come up with there own solutions. That listening deeply, respectfully and without jumping in with our own agendas, is a very powerful and transformative tool for change.

It is also based on the assumption that developing more comfort with not knowing the answer and being willing to stay probing longer (both as questioner or responder) can lead to deeper, more creative and lateral solutions than when we restrict ourselves to asking the questions that we know the answer to already. As Peavey says "What we know of life is only where we have decided to rest with our questioning." (Peavey 1994 p.86)

Strategic questioning is about generating a range of options. If we find ourselves in a situation with only two options such as : for or against, do this or that etc., chances are we are locking ourselves prematurely into a false dichotomy. Always be suspicious if there are only two options presented!

Strategic questioning is also based on the assumption that people get stuck or appear apathetic on social and environmental problems for all sorts of reasons other than that they don't care. These processes can help people reconnect with their feelings of concern, dreams, visions, social conscience, unique contributions as well as promoting learning from their past attempts to change. Strategic Questioning emphasises the importance of building rapport, and creating a sense of safety. This sense of safety builds when the other is assured that the questioner is not trying to catch them out or manipulate them in a certain direction. This is extremely liberating for parties who might be expected to automatically be in opposition. Bridges to other points of view can begin to be built.

A central concept of strategic questioning is the notion of finding longer lever questions. Peavey likens this to prying off the lid on an old paint can - you can do it with a short lever with not much effect perhaps a small crack - or with similar effort using a longer lever (or deeper question) we can lift off the lid and begin to stir up more creative solutions, and chip away the old crust holding it all in place. We may ask short lever questions that don't produce much new thinking such as: "What happened?" or " Why don't you do such and such...?"

A longer lever question is like a fulcrum that can lift much bigger weights, takes you into new territory. Sometimes long lever questions can't be answered for some time perhaps even years after they have been asked. They plant seeds. Examples might be "How would you like this to be in 5 years time?" or "What are all the possible ways we could tackle this?". "What would it take to clean up this river?" A long lever question might also ask the "unaskable," taboo or too obvious question such as "How can cotton-growing be environmentally friendly, while remaining profitable?"

## WHAT ARE SOME OF THE CONTEXTS IN WHICH STRATEGIC QUESTIONING CAN BE USED?

We use it a lot in our activist support group. This is a team of four women who some together to give each other time and attention to sort through priorities, think about the next step and gain more courage to be bold and true to ourselves and our values in our social change work.

Sue & Col Lennox, former secondary teachers in Sydney, introduced this approach to their students in response to an chemical spill in the local creek. The students were in an uproar when they found all the fish in the lagoon (which is fed by the creek) were dying. Susie and Col thought: "here's a chance to use strategic questioning".

They taught the childrren briefly how to do it by asking:

"How should it be?" What needs to be changed?" "What should we do?" "What can you do?" "What do you see?" "What do you know?" "How do you feel?" "How could it be?" "How should it be?" "What needs to be changed?" "What should we do?" "What can you do?" "What support do you need?"

The students went out to use these strategic questions to question their neighbours, people working in the industrial estate upstream (which was where the chemicals had come from), their fellow students and teachers. They also went to the creak and consulted the creek. In doint this they saw the pain of the creek and that they were not separate from it. They knew they had to do something. They came back from their consultations with many perceptions and expressions of concern. From their questioning they had also uncovered some good ideas of what to do and what others would be willing to do. The beginnings of a community strategy had been born. And best of all, the students did not have to do it all themselves - and nor did the Susie and Col!

Fran Peavey uses strategic questioning as the basis for strategy forming in the clean up the Ganges campaign in India. As a foreigner to the Indian culture and as a non-expert in river pollution, the campaign that has been built from the answers to her questions is quite remarkable.

My friends on Lismore city council have used it to overcome resistance to community consultation. They completely dropped all adversarial strategies and took opposing counsellors and council staff out to lunch and questioned them about how they perceived community consultation, what experiences, both good and bad, they had had with it, and how it might possibly work in the Lismore Council area. Community consultation is now back on the agenda.

These are just a few examples.

Lets look in more detail and the nature of the questions. The questions can be divided into types. These question types follow each other in a logical sequence that you can take someone through on an issue of a personal, community or social nature they may feel stuck with. There is no formula of course; every context is different and every relationship, however fleeting, has a unspoken contract about what is appropriate for this situation. You want to aim to get into a zone of creativity and probing without going over the limit of comfort, invasion or confrontation.

The value we find in outlining and practising the different question types is that one may find a tendency to ask only certain types of questions and neglect others. For instance, you may tend to avoid asking feeling questions about serious environmental issues and focus on action questions. Exploring peoples feelings about local pollution, clearing of trees etc. may uncover and validate a deeper commitment and caring based on acknowledging a sense of interconnectedness. Or you may uncover anger that can be channelled into action rather than cynicism. Sometimes these unacknowledged feelings are blocking clear and creative thinking, trust and imagination. If we jumped straight into "what should they do about it?" These deeper levels may be lost.

As a questioner, keeping the focus on that person as a potential agent of change is also important. We have strong habits of complaining about what others are doing and can get easily stuck in how they should change. It can be useful to know what we expect from others, but it has limited value as an empowerment tool. A skilled questioner can steer the person back to the edge where they can make a difference. By asking them questions that assist them to get clearer on what sort of attitude shift, action strategy independent of or in relation to this person, or relationship building strategies that could influence these people?

## STRATEGIC QUESTION TYPES

The first few question types set the scene and context for strategic questions, rapport is built, key facts and perspectives are explored.........

1. FOCUS questions: identify situation, issues & key facts...
Key words: what, who, concern, affected you etc ...........eg....

- What are you most concerned about?
- How has this affected you?
- What happened?
- Who else is involved?

2. OBSERVATION questions: what one sees and the information heard regarding the situation
Key words: see, hear, know, find, etc......... eg..........

- What do you notice about this?
- What do you know for sure and what are you not certain about?
- Which sources do you trust and why?

3. ANALYSIS questions: focus on the meaning given to events, how does this person think about this situation, what motivations are ascribed to key players. You are still gathering information....
Key words: think, why, anticipate, analyse...etc .. eg........

- What does this mean to you?
- What do you think is motivating that person?
- What do you see as the relationship between.....and ......?

4. FEELING questions: concerned with bodily sensation, emotions and health. Key words: feel, suffer, needs, frustrated, sad, angry etc.... eg..

- How do you feel about this...?
- How has the situation affected your physical or emotional health?

Now you are entering the strategic questioning zone that increases the motion by digging deeper......

5. VISIONING questions: concerned with identifying ideal's, dreams, values.. Key words: hope, wish, like, love, better, justice...etc.......eg.....

- How would you like it to be?
- What about this situation do you care so much about?
- What is the best out come you could imagine?

6. CHANGE questions: concerned with how to get from the present towards a more ideal situation.. try to find the individuals change view..
Key words: how to change.., make a difference.., what's worked? eg.

- How could the situation be changed?
- What would it take to change this?
- Who could make a difference?
- What changes have you heard about.. how did they come about?

7. CONSIDERING THE ALTERNATIVES: examine the possible options for achieving the vision and how change could happen. See if you can get at least more than two options, encourage loose, creative thinking.
Key words: options, all the ways, other ways, crazy ideas.. fantasies

- What are all the ways you could accomplish these changes?
- what is your wildest idea?
- Have other possibilities occurred to you?

8. CONSIDERING THE CONSEQUENCES questions : explore the consequences of each alternative (you may need to return to feeling questions.)
Key words: effects of, likely to happen, impact, outcomes..

- What would the effect likely to be of....?
- How would......... effect others in your group?
- How would you feel doing........?

9. CONSIDERING THE OBSTACLES: identifying obstacles likely (from outside and inside the person) and how they could be dealt with. Obstacles may include attachments, addictions, doubts, values or needs of any party.. Focus on what is stopping change from happening.
Key words: blocks, getting in the way, preventing, holding you back...

- What holds you back from doing...?
- How might you sabotage yourself achieving....?
- What barriers might....?
- Who is likely to object if......?

10. PERSONAL INVENTORY & SUPPORT Questions: concerned with identifying one's interests, potential contribution, particular skills, assets, resources and the support needed for action.
Key words: your part., role, skills, assets, influence, help, support, back up • What would it take for you to ......?

- What do you like to do that might be useful to......?
- What aspect interests you the most?
- What support so you need to work for this change?

11. PERSONAL ACTION questions: getting down to specifics of what to do, how and when.. actual planning...
Key words: what exactly, when, who, how, first step..

- What is your first step?
- Who would you need to talk to?
- How could you involve others?

It takes quite a lot of practice to learn the subtleties of the art of strategic questioning, which include verbal aikido or re-framing to move around obstables and asking "fluff-busting" questions that elicit more preciseness and cut through vagueness and unquestioned assumptions. It is also important to avoid the trap of making questions into disguised manipulation, blame or advice.

Of course, strategic questioning would be of little use if we didn't combine it with excellent and focused listening. Strategic Questioning takes a special type of listening.

Tuning into the deepest part of the person you are listening to:

** You look for the obstacles to caring, the blocks to action.

** You look for what is pushing people, and why they feel compelled to do something about the issue.

** You look for the group's ideas of how they want things to be - how they see things could or should change.

** You look for how they think about change and how change happens in their lives.

** You look for the path to change that the group sees - however dimly and timidly they see it. Sometimes you explore the path together, asking questions that allow the questioner and the person answering to think freshly and creatively.

** You look for the dreams and goals planted deep in the person's or group's heart.

** You look for how to remove the resistance that is found on the path for change.

** You look for feelings as they anticipate each possible choice or option in front of them.

** You look for what support each person would need to move on any path for change.

As the examples I gave earlier indicate, by using strategic questions and focused listening it is possible to build whole strategies for change

I would like to sum up with saying asking a good long lever question at the right moment can be a lot more powerful than giving ready made answers. What sort of difference do you want to make and what will it take to make it?

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# The role of environmental interpretation in the management of the natural resources in a recreational area.

I. Arevalo-Vigne and M. Adams
Plant Sciences
The University of Western Australia

## SUMMARY

Research in Kings Park bushland (Perth, Western Australia) showed that the distribution and intensity of human trampling in the bushland was related to 1) the presence or absence of environmental interpretation; 2) the type of environmental interpretation; and 3) the number of visitors accessing to a particular place.

The 'trampling effect' is due to a combination of visitor behaviour and the quality of interpretive messages.

In order to accomplish the educative role of interpretation and reinforce the objectives of the management of the natural area, interpretive messages should include information on 'community' or 'ecosystem' attributes and on the potential damage that can be caused by visitors. Information which focuses on target species tends to produce negative effects on the environment, resulting in conflicts with the management of the place and questioning the effectiveness of environmental education in a recreational area.

## INTRODUCTION

The impacts to the environment in natural areas due to recreational activities depend on the nature of the activity and its frequency (Edington & Edington, 1986; Liddle, 1975; Liddle, 1988). Human trampling is among the recreational activities that could have a significant impact because environmental conditions of the area may affect the rate of degradation of the natural resources (Hylgaard & Liddle, 1981; Sharpe *et al*, 1982; Sun & Liddle, 1993; Weaver & Dale, 1978).

National parks and protected areas use environmental interpretation facilities to i) provide the visitors with simple, understandable and accurate information regarding natural and cultural resources; ii) to develop an understanding of these resources and their function in the whole environment and iii) help the management of the place by instilling a sense of responsibility towards the conservation of these resources (Ham, 1992; Lewis, 1980; Russell, 1976; Sharpe, 1982).

However, in many cases interpretation is not doing enough to stop the impacts due to visitors usage. The lack of connection between management and interpretation programs results in the deterioration of the values of the natural area compromising the image of the reserved area (US National Park Service, 1994).

The objective of this research is to give a preliminary approach to how environmental interpretation affects human impacts in an urban bushland area that is easily accessed by a large city population.

## MATERIALS AND METHODS

The present study was conducted in Kings Park bushland during and after the Wildflower Festival in the months of September and October 1996.

### The place of study

Kings Park is an urban recreational park located in the heart of the city of Perth (Western Australia). Of its 400 Ha, approximately two thirds is natural bushland with a condition that ranges from fair to good (Kaesenhagen, 1995). Kings Park is the centre of attraction for many visitors and local residents.

Recreational facilities such as restaurants, picnic areas and playgrounds, are surrounded by natural bush and the botanical gardens. Visitors have access to any place within the park because there are no physical barriers.

Kings Park trail system includes both paved and natural trails; part of them are used for interpretation purposes. Guided tours (run by volunteers), and signs are some of the interpretation services accessible to visitors.

Several non-official paths or tracks are also visible in the bush and they are the result of visitors wandering to observe plants and flowers.

### Site selection

Sites with the following characteristics were located along the trail system:

A) Interpreted: sites where any type of interpretation was done during the study period

i) with sign: sites where signs were at least 3m. from the interpreted object. The selection included only two of the original four signed sites because either the site presented no object related to the message, or the object was too close to the sign. For this experiment, 3 new signs were added to existing signs. One of them was discarded from this category because it was used during the guided interpretation. Total number of signed sites = 4.

ii) guided: sites that were recognised as part of the interpretive (guided) activities during the Wildflower Festival. Total number of guided sites = 6.

B) Non-interpreted: sites outside the interpreted area. There were no interpretation services and trails connected a single object. Total number of non-interpreted sites = 4

### Physical Research

Changes in the vegetation and soils (Burden & Randerson, 1972; Cole, 1978; Sun & Liddle, 1993) due to pressure were measured 70 cm from the concrete path to avoid recording impact effects due to cars patrolling the area.

delimitation of trampled areas.- We map each site by tracing perpendicular lines to the concrete path every 25 cm. and registered the intersection of this lines with the limits of trampled and untrampled zones.

soil compaction.- Readings of soil penetration resistance with the use of an impact penetrometer. Resistance is calculated by the number of blows needed to introduce the instrument 4 cm into the soil when a weight of 2Kg is released from height of 27.2 cm.

percentage of trampled areas.- Relation of each trampled areas to a an untrampled area of 83.65 $m^2$ generated by the maximum axis values (7.0 x 11.95). Trampled areas were calculated by analysing the quantity of pixels on the images produced by the delimitation method. (Adobe Photoshop v.5).

**Behavioural Research**:

Visitor Behaviour.- Frequency of behaviours displayed by visitors during interpreted tours. (Harris, 1995). Behaviour displays were categorised as: 'out of path', 'overtaking', 'touching object', 'touching other objects', 'close to objects', 'close to interpreter' and 'in the path'.

i) individual behaviour: The distribution of activities of an individual along an interpreted tour. The selection included a) an individual who apparently would display most of the categories above mentioned (disruptive); and b) another randomly chosen within the group. Both recorded at the same time.

ii) group behaviour: The display of activities by all the members of a group recorded at the same time. Patterns of behaviour were registered at each interpretive stop. The values obtained were then converted as the average for each member of the group

guide attitudes: observations on the frequency of messages the guides gave to the visitors along the tours. There are 2 categories:
i) injunctions: messages directly or indirectly bewaring the visitors: 'do not trample', 'do not touch', 'be careful', and 'keep to path'.
ii) environmental awareness: related to problems affecting Kings Park bushland. These are 'fire' 'weeds', 'litter', 'trampling', 'feral animals', 'dieback', 'pollution', and 'degradation' (houses, urbanisation, ants).

## RESULTS

delimitation of trampled areas.- The patterns obtained for sites with signs and non interpreted show a clear unique trail from the concrete path to the object of interest, while in sites with guided interpretation the pattern tend to be a large trampled area from the concrete path to nearby the object (Fig 1).

soil compaction.- We found no differences in penetration resistance values for sites with signs as well as for those with guided interpretation and no difference between guided and non-interpreted sites. Penetration resistance was greatest at 'old signed sites' and least at 'non interpreted sites' (Table 1).

percentage of trampled areas.- The areas more visibly affected were those in which guided interpretation took place. The analysis shows that there is significative difference between these category and the others (Table 1). The lowest values for trampling were obtained for those with no interpretation.

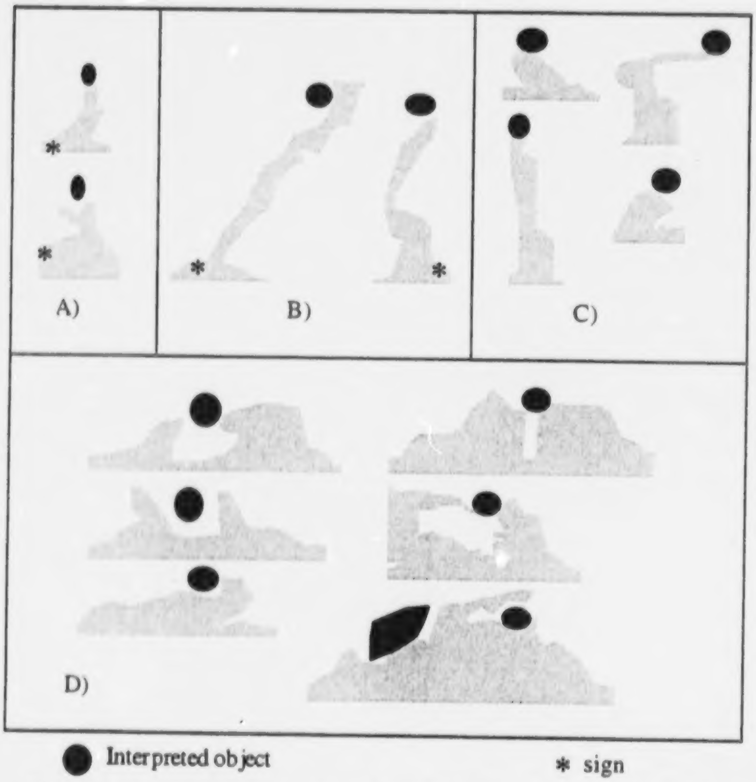

Figure 1.- Patterns of trampling in Kings Park bushland after the Wildflower Festival. A) With new signs; B) with old signs; C) Non interpreted; and D) with guided interpretation.

| plot type | Penetration Resistance mean values (bar) | Trampled area mean values (%) |
|---|---|---|
| With sign - old | 3.2 *a* | 7.2 *a* |
| With sign - new | 3.2 *a* | 6.9 *a* |
| guided | 2.7 *a,c* | 14.9 *b* |
| Non Interpreted | 2.4 *b,c* | 5.5 *a* |

Table 1.- Penetration resistance and Percentage of trampling as per site category (The mean values followed by the same letter are not significantly different; $p<0.05$ Fisher's PLSD).

individual behaviour.- The results of observations on individuals showed that an individual with typical disruptive behaviour allocates a high proportion of his time (92.9%) to actions outside the official path. Most displays involved getting close to the object and or to the interpreter. On and Off behaviours for the second individual were almost balanced (Fig.2).The total group effect is conditioned by the number of disruptive individuals within a group.

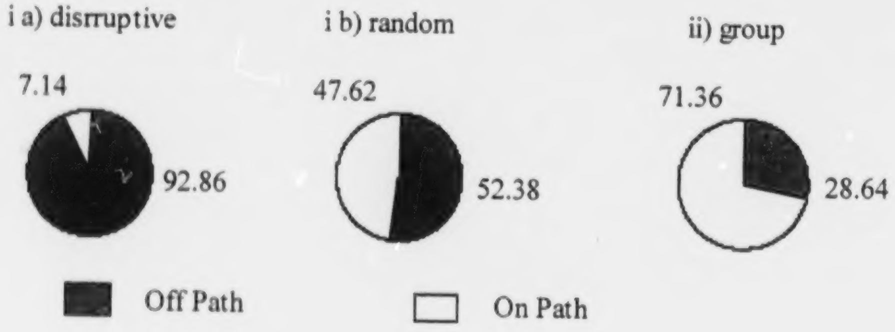

Figure 2.- Allocation of time for the three types of behavioural observations during guided tours.

group behaviour.- An increment in the number of visitors increments the frequency of 'on path' and 'off path' situations. Figure 3 shows that as group number increases, the proportion of people on the path increases.

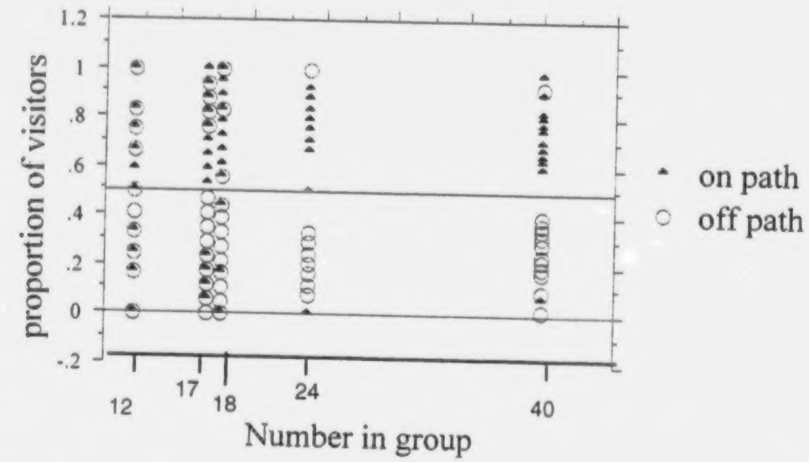

Figure 3.- Effect of the number of visitors on the proportion on 'off path' and 'on path' situations.

guides attitudes

i) injunctions.- Observations on the frequency with which guide alerted visitors to possible 'visito impact' during the tours showed that in only 8 out of 173 opportunities (interpretive stops) they did give injunctional messages to the visitors. They represent a very low percentage of the messages within each tour

ii) environmental awareness.- The guides provided information on environmental problems that are affecting Kings Park bushland. They pointed out that the invasion of weeds and fire are the major problems, representing 64 % and 18 % of their information on environmental problems. Fire as a problem is ambiguously explained as it is usually suggested as promoting the wildflowers. The other categories have low values. Trampling and feral animals were not mentioned at all.

## Discussion

The pattern and extent of trampling at each site is related to the number of people who visit it. Signed and non-interpreted sites support a low number of people at the same time (1-4) over a long period. The observations on visitors' behaviour explain the presence of trails in these sites as the physical expression of the degree of interest some people may have in a particular object (plant, flower).

The analysis suggest that in this recreational area guided tours are the most damaging activity to the bushland. The physical changes in these sites are the consequence of the large number of visitors they support on a short period of time (during the 10 days of the Wildflower Festival tours were scheduled 3 times a day with an average of 30 persons each). A second factor is the guides' poor information on trampling and its consequences, interpretation based on particular plant species, and the lack of injunctive messages preventing people from straying away from official paths.

Although the results for non-interpreted sites suggest that the absence of any sort of interpretation could be responsible for a low impact to the bush, it is important to note that the results are based on 4 sites where obvious trails connected only one object of attention. In addition non-official trails are numerous in Kings Park bushland and their extension could be more than the total area affected by interpretive tours.

The results point out that facilitation of people's enjoyment must also consider maintaining wildlife values. The public must be channelled in such a way that no damage is done to the natural things they have come to see (Cameron-Smith, 1977)

In all interpreted situations visitor behaviour, guide attitudes and the content of the messages play an important role in the trampling effect. Guides act as mobile signs giving more information on a single issue, sometimes more appealing than a sign. This condition attracts visitors to leave the path (in particular to those who tend to have a disruptive behaviour) and trample the surroundings of the interpreted area.

A key goal of interpretation is to promote conservation of the resource and it is critical that the public become sensitised to the value of the resource. Many visitors lack an understanding of the reserved area or the form of protection by management. Environmental interpretation becomes important because interpretation can teach the interdependence of living forms, its relationship with Man and the different ways of management values and problems in an interrelated basis (Henning, 1990). An ecological approach could provide the visitor values of enjoyment and appreciation of its recreational activity as well as an understanding of the ecosystem.

It might well be part of the guide's work to instil responsibility towards the environment by giving information of the interpreted object in the whole context, and introducing previously unthought of issues such as trampling. Developing interpretation on this condition and, because it is not possible to regulate the number of potential disruptive visitors in a group, to reinforce it with injunctive messages.

In protected areas a significant portion of interpretation issues is aimed at achanging visitor's attitude towards the environment. However, in many places it is not helping to complement the management program of the reserved area. The obstructions to interpretive programs include inadequate staffing, funding and facilities but overall the lack of a substantiated framework of goals is a major impediment to guides to contribute to the conservation objectives of reserved areas. (Knapp, 1995; National Park Service, 1986).

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# AWARE (Victoria): Educators Who Talk Rubbish

Patricia Armstrong
Recycling Education Centre
Gould League of Victoria
Moorabbin, Victoria

## SUMMARY

AWARE (Victoria) is an association of waste educators that aims to advance waste education in Victoria and elsewhere. The association has been very active in providing opportunities for networking between members and in promoting waste education in the state.

### Introduction

AWARE (Victoria), the Association of Waste and Recycling Education, is an informal networking group with its main purpose that of fostering communication between interested waste and recycling educators in Victoria. This communication is principally about effective educational resources and school and community education programs and strategies. There are no fees to join AWARE (Victoria).

### Aims

The main aims of AWARE (Victoria) are to:
- lead to the betterment of waste minimisation education;
- provide opportunities for networking between waste educators in many sectors;
- minimise unnecessary duplication of resources and education programs;
- provide input into waste minimisation education strategies;
- provide input into school education curriculum at the Victorian and Commonwealth levels.

AWARE (Victoria) has so far attracted more than sixty members from a wide range of areas including:
- conservation/environmental officers in local governments
- education officers for industries and materials recovery facilities
- education officers in Commonwealth and State waste agencies
- educators in specialised waste minimisation education centres
- teachers in schools and tertiary institutions.

## Membership

AWARE (Victoria) has two types of membership:

1. ***Planning Group***. This group meets monthly and plans the activities of the group. These meetings provide invaluable networking opportunities and are always well attended.
2. ***General Group***. These members participate in AWARE (Victoria) activities and are supportive of the aims of the association.

All members are advised of forthcoming activities through the Recycling and Resource Recovery Council (RRRC) newsletter and other sources. A database is kept of members but, for the present, there is no regular mailout or newsletter.

## Activities

AWARE (Victoria) has been very active in waste education. The association has so far:

- prepared a database of people working in waste minimisation education in Victoria and other States and Territories;
- prepared a database of useful resources to assist schools and other groups to implement waste minimisation and litter reduction education programs;
- conducted a seminar called "Getting the Message Across - the New Waste and Recycling Services." This seminar was attended by more than 50 people;
- organised a national workshop on waste education in September 1996. This was attended by 25 delegates from NSW, South Australia, ACT, Queensland and Victoria. The main outcomes of this workshop were to establish similar AWARE groups in the other states and to investigate the feasibility of setting up of an electronic communication service eg, subscriber list, for waste educators.

For further information about joining an AWARE group, contact:

Pat Armstrong
c/o The Gould League of Victoria
2 Genoa Street Moorabbin Vic 3189 (PO Box 117)
Tel: (03) 9532 0909 Fax: (03) 9532 2860

AWARE (Victoria) is funded by the Victorian Recycling and Resource Recovery Council (RRRC)

# EDUCATING ABOUT GENETIC ENGINEERING:
## The Hard Cell to Buy New Genes

Karen Benn
Curriculum Corporation

## SUMMARY

We are swamped with all the 'good news' about genetic engineering; how it will improve our lives and mitigate or prevent environmental problems. As environmental educators we need to critically examine these claims and access information from a variety of sources to ensure that students are provided with the full range of opinions in which to debate the promises and perils of this technology.

## INTRODUCTION

Biotechnology is one of the fastest growing industries. The impact and implications that these technologies are having on our behaviours, choices, ethics and values are far reaching and will set the agenda for the next millennium. How much do you know about these technologies, particularly in the area of genetic engineering? How well equipped are you to evaluate the use and abuse of these technologies? Are you aware of the impact on consumers of genetically engineered foods and Australia's food labelling regulations? Or the regulations pertaining to the development and release of genetically manipulated organisms (GMOs) and how this affects our economy and environment? Would you feel comfortable as an educator to 'teach' about genetic engineering and its potential impact on our current and future society?

Right now in Australia approvals are being sought by scientists, in conjunction with business and government, to develop and release 'new' organisms – genetically engineered organisms (GMOs). The approvals are made by a small group of expert scientists. The proponents can develop and release these new organisms without approval, if they so desire, even though this would risk public disapproval. However, there are no specific laws to protect people or the environment and no recourse if the new organism causes any damage to people or the environment.

Concerns extend to the regulation of the scientific, social, ethical and legal implications of genetic engineering and the use and misuse of resulting genetic products and information. This paper concentrates particularly on the regulation of the development of genetically manipulated organisms (GMOs) and their release into the environment. As an emerging technology backed by billions of investment dollars, biotechnology and genetic engineering are 'here to stay' and will potentially become as prominent in our lives as the use of hydrocarbons, synthesised chemicals and computer technology. Potentially GE will affect our lives in almost every way from what we eat and how it's grown, to what medicines we take and how long we live. There is a sense of urgency to ensure that we develop a reflexive and responsible regulatory system which will hopefully prevent a recurrence of the kind of scenarios experienced with nuclear power in the 1950s-70s.

GE is controversial because there is much uncertainty regarding the risks and benefits of the new technology. How do we regulate GE and formulate appropriate policy in a time of profound uncertainty? The current system is fraught with social and environmental inequities and dangers. This paper demonstrates the problems with the current system and with the practice and process of genetic engineering itself, and proposes an improved model for its operation and regulation.

## The promises and perils of Genetic Engineering (GE)

We are being sold the promise of GE without any opportunities for discussion or participation in the decision-making process. The enthusiasm of scientists and the media about genetic engineering needs to be tempered with caution and realism. It is important to recognise that GE is not simply a time-saving extension of the historical methods of selective breeding (cross-breeding). It is a fundamentally novel technology. Vast and wondrous promise has been attributed to this new technology, however, history provides us with a plethora of unfulfilled promises from new technologies, along with a range of associated problems and catastrophes which outweighed the benefits received.

A more general concern with this biotechnology is that many proponents are extolling a reductionist view, whereby organisms are simply a sum of their genes. Genes and the environment are seen as dichotomous, rather than having a highly integrated relationship. This leads to the more troubling notion of 'genetic destiny'. Scientists are searching for genes for all sorts of human traits and behaviours, such as criminality, homosexuality and alcoholism. An organism's traits and behaviours are not just the result of its genetic make-up, but rather a combination of genetics and environment. The environment, both social and physical, has a profound effect on how genetic instructions are expressed by the organism. An organism's genetic make-up provides the potential for the expression of external characteristics, however their connection is infrequently causal or direct. Yet proponents of GE subscribe to this tenuous and infrequent relationship.

The 20th. Century 'first world' culture has become dependent on scientific 'breakthroughs' to fix the problems it has created for itself. The immediate powerful benefits tend to overshadow the possibility of unexpected environmental, social and ethical problems in the long term, as was the case in the 1950s and 60s with regard to the development and use of nuclear energy. These possibilities must be recognised, given the very real potential for continued ecological damage and possible disasters stemming from the release of GMOs into the environment. It must also be understood that any new technology will affect the social, political and legal arrangements of the future. New technologies require a comprehensive critical analysis of both the risks and benefits, beyond the economic realm. It needs to be made explicit exactly what is being done, who is doing it and why are they doing it? Who are the beneficiaries and/or casualties of the development of GMOs? GE regulatory structures would be more effective if they provided mechanisms to inform public opinion of the wider ramifications of this technology.

A preferred regulatory framework would be based on the following principles:

1. Ecological sustainability.
2. Democratic decision-making process and opportunities for public input.
3. The precautionary principle.
4. Social justice and equity.
5. Liability and responsibility for action.

The promises of GE include the ability to grow more food, in a cleaner, more ecologically sustainable manner (with less fertilisers, pesticides and herbicides); to feed the starving millions; to cure us of genetically inherited diseases; to create organisms which are 'more useful' such as breeds of 'compatible' animals which we can use as organ donor stock for transplants into humans or for dealing with problems our actions have created, such as oil spills, salinity or pesticide resistant crops and livestock. These promises are inherently technocentric, promoting a vision of modern agriculture and medicine as having fewer inputs, a higher productivity and being ecologically safe.

In contrast, some critics argue that GE will generate new environmental and social problems including the spread of engineered traits to other domesticated and wild plants and animals ('genetic pollution'); genetic uniformity within and between species (loss of biodiversity); ability for corporations to design plants that respond to their brands of chemicals; and the extension of patenting to the level of the gene

Obviously we are more than the summation of our inherited genetic information, although you may not think so when you consider the human genome project which is racing to collect the entire compliment of human genetic material from every race on Earth. It is 'racing' because these cultures and sub-cultures, which are of so much interest to the HUGO project, are becoming extinct at a rapid rate, and it is believed that the genetic information in some of these cultures may hold *valuable* information such as the cure to a disease (like AIDS). It appears that the genetic information is worth more than the people themselves, as more attention and money is spent on collecting samples of these people, than in saving them. This is a reflection of the way we 'value' things and people in society — by their monetary costs and benefits.

One of the most common promises of GE is to engineer crops which will no longer require chemical applications as they will be pest resistant. Interestingly enough the use of chemicals in agriculture has increased with the release of genetically engineered plant varieties. Chemical companies have funded the production of genetically engineered crops which can withstand many more times the concentration of chemicals such as glyphosate and 2-4-D, so that even greater concentrations of these chemicals can be applied to the crops.

Genetically engineered foods are being produced which contain genes from completely different organisms, such as tomatoes containing fish genes. These foods are NOT labelled to identify them as genetically altered. This can have serious as well as ethical consequences, such as severe allergic reactions to certain foods. People need to know exactly what they are ingesting.

### How is a GMO proposal approved in the current system?

Briefly, the way that the process works is that a proponent, usually a corporation such as Monsanto or Bresatec (now known as Bresagen), or a research organisation such as Monash University or CSIRO, will put forward its proposal for the development and release of a GMO to its Intitutional Biosafety Committee (IBC), which upon review, if satisfied, will submit the proposal to the Genetic Manipulation Advisory Committee (GMAC). GMAC either supports the proposal or returns it with reasons for its refusal. The proponent is not bound by any law to follow GMAC's decision or suggestions. There is no legal recourse for a proponent if it chooses to go ahead and release the GMO, similarly there is no legal liability imposed on the proponent should any damage be caused from the release.

There are numerous steps that need to be put in place to provide the safeguards, monitoring regime, more democratic public representation, and liability for releases which are not approved or result in some harm or damage.

There needs to be a system which is responsible to an overarching set of legislation. There needs to be a multi-faceted system with feedback mechanisms, based on environmental and social principles which more accurately reflects the necessary considerations to be made by and for the broader public.

### Why is GE an area for concern?

Why is this new method of directing nature of such concern? Why does it even need regulation? GE is an area for concern because it is fraught with risk. The risks extend to society and the environment. The risks are difficult to measure and predict, but are likely to be even more far-reaching than the risks we have experienced with other modern technologies such as nuclear power.

The following areas for concern are varied and complex and are only touched on in this paper:

1. Ecological risks are not comprehensively assessed. GMOs are released into the environment with too little thought for their containment or the 'new' genetic material being transferred to similar 'wild' relative organisms.

2. The driving force behind GE is business and profit. There is a lack of adequate provision for liability in the case of incidents and accidents.

3. The patenting of new organisms, particularly agricultural ones, raises issues of ethics and equity. Like the 'green revolution', the only winners, from ventures which promise 'more, better, cleaner, greener food' appear to be the seed and chemical companies.

4. Ethics of tampering with life. Who decides on GE issues? How? Who do the decision-makers represent?

5. Who is analysing and managing the risk of GE?

If we reflect on the introduction of nuclear power in the 1950s we can recall how there was no apparent risk to our health or the environment. Nuclear power was presented as limitless, cheap, non-polluting and safe. The public remained happily ignorant of the dangers of nuclear power until the accidents and mishaps were reported and the public could actually see the problems associated with nuclear power.

Part of the problem of new sophisticated technologies is that they are invisible. Radiation from a nuclear power plant is far less visible than the smoke emanating from a coal-fired power station. The genetic engineering conducted in a laboratory is an 'invisible' technology with an invisible product. The genetically altered foods being prepared for the supermarket shelves are not distinguishable from those that have not been genetically altered. Because there is no labelling of genetically altered foods consumers have no choice to accept or reject this technology through their purchasing power.

A more responsible model would have a Genetic Ethics Council (GEC) as the central body for developing government policy based on environmental and social principles. When any funding body, especially government, is involved in funding GMOs it should be provided with the proposed GEC's environmental and social principles and criteria and also be responsible for reporting back to the GEC that the proponent followed the principles and criteria in its processes. All funding bodies, including the state, must be disclosed, noted and made partially liable for the development and release of GMOs, in order to make them behave more responsibly. One of the tasks of the GEC would be to review the rebate given to funding of all GE activities. Currently the rebate for funding bodies stands at 150%, with a recent proposal of reducing it to 125%. How would tax payers view this decision and on what premises has this decision been made?

Monitoring of GMO releases can be defined as an on-going examination of the GMO and its effect on the environment, other organisms, and society. Monitoring is a crucial reflexive requirement in the process of administering and managing the development and release of GMOs. The progress of all technologies, especially new technologies, needs to be monitored to assess the successes and failures. Monitoring needs to be managed by government to protect the public interest. The cost of monitoring could be shared with the proponent, as part of the process of developing and releasing a GMO. Without proper monitoring it is not possible to feedback the necessary information for proponents and the public in order to assess the full costs and benefits of a GMO.

Educative programs conducted by the proponents should not be funded by the government. It is not ethically sound for a government to fund CSIRO to conduct education programs about GE when the CSIRO is a major developer of GMOs, with the assistance of funding from large multi-national corporations. Instead, the government should be providing funding for consumer groups, and concerned community and environmental groups, to provide access to forums for the discourse and debate on this topic. Open discussion, through a range of media, is required. The proposed model provides for a broader public participation in the issue. Participation leads to education and further debate.

The people currently making the decisions (GMAC) comprise a group of scientists, mainly bioscientists. It is prefereable to have far-reaching decisions about the development and release of GMOs made by a much broader represenation of the public. In the words of Nelkin and Tancredi (1989), "...if you want to build a skyscraper, you need an architect who specialises in building skyscrapers, but if you want a panel to decide whether or not to build more skyscrapers, you do not want it to consist mainly of architects". Nor, in the case of either genetic engineering or the building of skyscrapers, should the decisions be based on the interests of business which stand to profit from them. What we need is wider public involvement and debate about the ways in which genetic engineering is likely to effect us, including benefits and costs. Virtually all scientific research is done at least in part at public expense, therefore the broader public should be more involved in the decisions about how the research funds are allocated.

The model we are proposing for regulation has been designed to be more responsive and accountable towards the ecological and health concerns of the citizens. We have purposefully placed the seat of power of the entire system within the Genetic Ethics Council (GEC), as it more democratically represents the citizens. The Gene Technology Authority's (GTA, which will replace GMAC), role is then more like that of a 'public servant' to the GEC as well as industry, without being just a facilitator to industry's proposals. It must be stressed that it is extremely inadvisable for the GTA, or any part of the decision-making process that has been proposed, to be under the auspices of the Minister for Industry, Science and Technology (ie under DIST), as this Minister would not be able to act impartially from industry, the supporters of GE and the proponents of GMOs. Both the GEC and the GTA need to be under the auspice of the federal Minster for the Environment (ie under DEST).

## CONCLUSION

The options for an ignorant public, regarding the risks of a new technology, include a repetition of the nuclear power paradigm, where the proponents were the source of all information, the governments acted as facilitators of the new technology, major accidents had to occur before the problems of the technology became painfully visible, and the lag time for the public to catch up with the real dangers of nuclear power took approximately twenty years. The option proposed allows for the education of the public in a much shorter period than twenty years. It allows for education through clear labelling of GMO products; for a self-reflexive model of regulation which will review the whole process of decision-making to reflect the opinions and concerns of the community; and for a legislative system which will encourage the proponents to consider the ethical principles and risks more fully when planning a proposal for a new GMO.

In short, the proposed new model for regulation of the development and release of GMOs in Australia will be a more democratically representative model which will reduce the risks of GE to society and the environment. It is envisaged that this proposed model will set an international standard that will be welcomed and revered across the world. If Australia and then other countries realise this model, there is the potential for international trade agreements to include the principles of the new model. Setting the preferred standard for minimum health and safety procedures for genetically altered products will provide the market edge. Australia stands to benefit socially, environmentally and economically from a more comprehensive model of regulation.

## REFERENCES

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# 'EnviroSchool': A Model for Environmental Education at the Secondary-Tertiary Interface

**Graeme D. Buchan, Robert L. Leonard, Department of Soil Science**
**and Betty Shore, Centre for Continuing Education**
**PO Box 84, Lincoln University, Canterbury, New Zealand**

## SUMMARY

The environment is *the* educational growth area for the coming millennium. Rescuing the planet and posterity from human excess requires new mechanisms for propagation of environmental understanding, ethic and action into the community. Reported here is a novel venture, with a university or other tertiary institute acting as a centre of propagation. 'EnviroSchool', an intensive five-day vacation school in Environmental Science for senior high school students from throughout New Zealand has been run four times at Lincoln University in New Zealand's South Island and has proved highly successful in stimulating wider environmental awareness in schools nationwide. The framework is described as an adoptable model.

## Introduction

*"Live your life as if you might die tomorrow, but look after the Earth as if you might live forever".*

This article describes a novel concept for the propagation of environmental education and action into the wider community from a university or other tertiary institute. 'EnviroSchool', an intensive 5-day vacation school for senior high school students (*c.* 16 - 17 years old) from throughout New Zealand is now a biennial event in the outreach calendar of Lincoln University. It has proved very effective in stimulating wider environmental awareness in high schools nationwide and, simultaneously, in promoting the host institute - Lincoln University, near Christchurch in New Zealand's South Island (Figure 1). The above epigram, a rewording of an old British farming proverb, summarises the objectives of EnviroSchool and the positive and proactive feelings achieved by its participants.

Globally, many tertiary institutes are now active in environmental and resource education. However, reaching a solution to global problems requires much more than the production of skilled graduates as a societal minority. It requires the ubiquity of a new ethic, namely, that of EARTHcare: *E*ducation and *A*ction to *R*eprieve *T*errestrial *H*abitat. As a contribution towards this objective, we and other staff members at Lincoln University initiated EnviroSchool in 1990 (Buchan 1992).

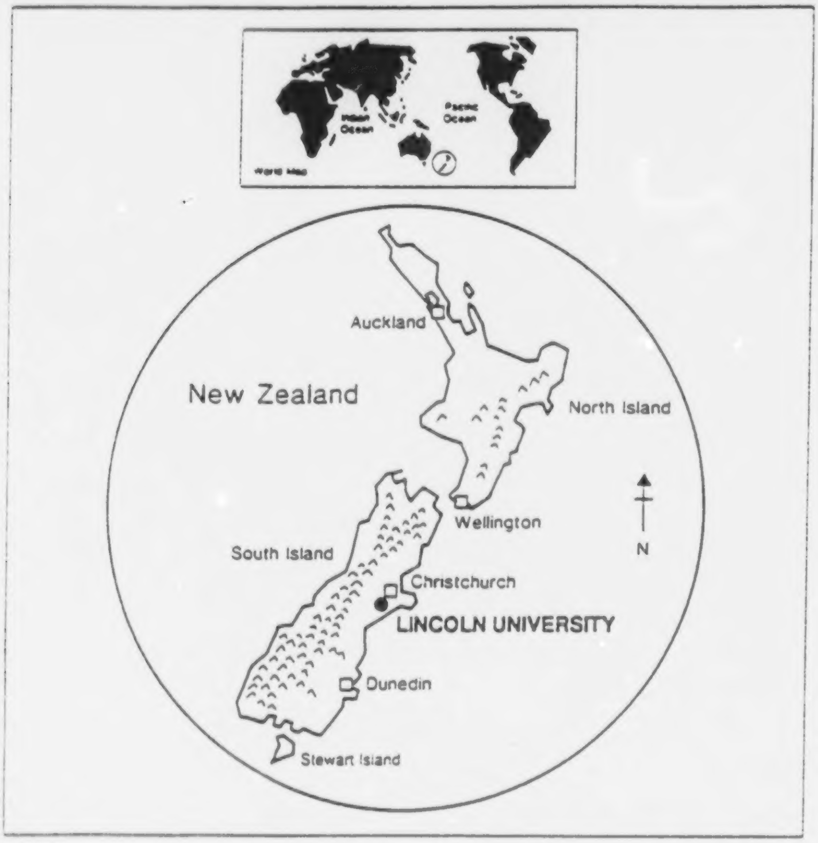

**Figure 1.** Location of Lincoln University, 20 km SW of Christchurch city (the 'gateway' to Antarctica), and in the Canterbury Plains. These are the largest alluvial plains in New Zealand, covering 750,000 ha, and lie in the centre part of the South Island, between the east coast and the foothills of the Southern Alps.

## Objectives

The objectives of EnviroSchool are several-fold:

1. *Science, Ethic and Action*: the 'SEA' triad.
   An understanding of the *science* of environmental processes is of central importance in the community. Only with a well-founded, mechanistic understanding can we: judge whether a 'problem' really is a problem; predict likely future changes; take well-judged preventative action; and formulate remedies to problems.

   However while science is essential for understanding, for effective application it must be coupled to an environmental *ethic*. Thus the EnviroSchool programme is interwoven with opportunities to present and debate ethical issues. Going one step further, science and ethic together address only the 'theoretical' approach to environmental issues. If we are to have real effect, they must be translated into *action*. Thus EnviroSchool provides pointers to action, such as changes in personal lifestyle and resource use, school recycling schemes, community conservation schemes, and desirable target policies at national and international levels. Carried back to their schools and communities, these pointers have a strong multiplier effect in promoting environmental stewardship.

2. To promote the university. Since gaining its autonomy as a separate university in 1990, Lincoln University has embarked on new teaching programmes in environmental, ecological and resource studies. Hence EnviroSchool has had a strong role as a flag-raising event, open to senior high school pupils from throughout New Zealand (i.e. potential students). Many universities run 'summer schools', often simply open-house events manifesting available courses. However, a *thematic* school is better because it gives us the opportunity to achieve our wider objectives (see below). Environmental science provides an obvious theme to fulfil these objectives. Topical and appealing, it has the breadth to encompass the wide range of expertise within the university, as well as the diverse and excellent human, physical, and geographic resources of the Canterbury region (Fig. 1).

3. To provide an opportunity for young people to contribute to the programme, by sharing their own views, experiences, and ideas for action, either in formal presentations or through informal exchange.

4. To help the university itself identify and focus more clearly on its own objectives and future areas of specialisation.

**EnviroSchool: The Planning**

EnviroSchool has now been run successfully on four occasions, biennially since 1990. The core 'organiser' group consists of five university staff, cutting across science departments, the university's Practical Work Unit, and its Centre for Continuing Education.

The first priority in planning each school is to establish a programme matching EnviroSchool objectives (Table 1). We decided that for efficacy the programme must be experiential and interactive, and include laboratory and practical work, and a major one-day field trip. Logistically, this decision limits the number of participants to bout 130. This is the largest group that can be effectively managed in practical sessions and (for rostering site visits and field trips) represents about three bus loads.

A second priority is to draft a budget, decide on an acceptable registration fee, and seek external sponsorship to make up the potential deficit. This priority is crucial. The school has to be nearly self-financing, except for the invisible costs of staff time and the use of university teaching space. As an educational venture, the school is strictly outside our tertiary-teaching remit and, therefore, the funding of the university. At the same time, expenses are high, especially for travel. This has been considerably eased by generous airfare discounts offered by New Zealand's national airline.

The current registration fee is $330 (New Zealand) with some scholarships offered in cases of financial hardship. Following extensive canvassing of industrial, commercial, government, and other sources, the school typically secures $20,000 from sponsors. One European-based oil company, well known for its interest in environmental education, has acted as the major sponsor and is given major naming and publicity rights.

We have been fortunate to secure Sir Edmund Hillary as a prestigious patron of the school. He is well known for his links with young people, his interest in ecological issues (Hillary, 1984), and not least his pioneer role in the first successful ascent of Mount Everest in 1957!

**TABLE 1. EnviroSchool: Programme Summary**

| Programme Summary | |
|---|---|
| *Monday* | |
| Morning | Registration. |
| Afternoon | Welcome and introduction.<br>Lecture session 1: Planet Earth: its climate and resources.<br>Topics: Earth's special characteristics - a life-enabling environment; climate-controlling factors; history of Earth's climate; global environmental issues and sustainability<br>Lecture titles: 'Ode to Planet Earth', 'Climate Change', 'The Diversity of Life' |
| Evening | Recreational activities. |
| *Tuesday* | |
| Morning | Lecture session 2: Role of science in understanding and protecting the environment; the need for science in managing the environment; human health and climate change; indoor air pollution; the environmental crisis in Eastern Europe. |
| Afternoon | Christchurch city circuit: Visits to National Radiation Laboratory, city sewage treatment works, government research lab (biological control), Antarctic Centre. |
| Evening | AV presentation 'The sacred nature of the mountains'. Sampler's Supper. |
| *Wednesday* | |
| All day | Plains and Mountains Tour: Field trip across the Canterbury Plains to the eastern foothills of Southern Alps.<br>Themes: Natural processes in the landscape; human uses of the land. |
| Evening | 'Earthcare in Action'. |
| *Thursday* | |
| Morning | Lecture session 3: The environment of Aotearoa / New Zealand .<br>Main themes: (1) ecology in balance and imbalance, (2) the marine environment. |
| Afternoon | University browse-about. Free time to survey facilities: library (special book display), bookshop, grounds.<br>Hands-, feet-, and fingers-on activities.<br>A 'menu' of 12 laboratory sessions, fieldwork, and computer modelling exercises offered, each occupying 1½ hours; participants select two activities. |
| Evening | EnviroSchool dinner. |
| *Friday* | |
| Morning | Lecture session 4: Stewardship and conservation.<br>Topics: Environmental ethics, organic farming, environmental management. |
| Afternoon | Summary and closing session, including a talk on course and career opportunities. |

Our sponsorship requests are considerably bolstered by two factors:

- The perception that EnviroSchool is designed for young people, specifically, to help prepare them as future custodians of the environment.
- The endorsement of the school by the school's prestigious patron.

The school typically receives 160 applications for the 130 places. Some of these applications are almost pleas to attend.

The selection criteria applied are crucial. To avoid pure academic elitism, or institutional self-interest, we select participants based on a balanced combination of factors: academic ability, motivation for environmental issues (e.g. membership of school or other eco groups), and commitment to an environment-related tertiary study or career path (including, of course, the likelihood of attending Lincoln University). 'Disadvantaging factors' are also taken into account, especially lack of previous access to such collective activities, because of either rural remoteness or personal hardship. Many applicants are already environmentally committed, either through school groups or through membership of national and international caretaker groups (e.g. Greenpeace). Interestingly, about 70 to 80% of the applicants and, subsequently, 70 to 80% of those accepted, have turned out to be girls. Rather ironically, this situation leads to comments from some of the more 'socially oriented' female participants about the lack of males at the school, with exhortations to achieve a better balance next time!

## EnviroSchool Programme

Broadly, the programme is designed to ensure three transfer processes: *knowledge transfer*, especially of the scientific bases of phenomena; *ethic transfer*, by discussion of values and collective responsibility towards the environment; and *action* transfer, by providing pointers to action. A key guiding principle is the desire to convey the positives as well as the problems of the environment. First, we want to share with young people the excitement of applying science to natural systems. Second, we recognise that positive feelings towards the environment provide the most powerful impetus to understanding and conserving. Although honest attention to problems is essential, it has to be balanced by optimism for the future. We do, of course, point out that this optimism is contingent upon collective action now.

The programme, outlined in Table 1, is a mix of lecture sessions, practicals and workshops, a major one-day field trip, discussion groups, an 'interactive' evening and an evening of 'EARTHcare in Action' in which environmental groups, such as Greenpeace and the New Zealand Forest and Bird Society, describe their objectives and activities. These functional elements are balanced by a social programme, which includes a sports and recreation evening (a great mixer), a special 'EnviroSchool dinner' with keynote speaker, and a campus 'browse about'. A special evening 'sampler's supper' conveys basic ideas about Earth's food resources, food security, and the carrying capacity of the land and offers samples of globally diverse vegetarian foods. The programme is greatly enhanced by external contributions, by the EARTHcare groups, government laboratories and departments, invited speakers and, not least, by presentations by participants themselves reporting on their high school activities. In this way, the programme gains relevance and practicality from its interpenetration within the wider community.

The four lecture sessions are designed with a "zoom-lens" approach.

1. The first session, with the lens set to "wide angle", views planet Earth, global climate, and the issue of sustainability.

2. The second session zooms in on some key *processes* in the environment that illustrate the need for a scientific approach. This session includes current climate change.

3. The third session zooms in on the New Zealand environment, including Antarctica. Inclusion of the latter is highly appropriate for a university only 20 km from Christchurch, the city that has historically served as the British and US gateway to the Antarctic.

4. The fourth session, on stewardship and conservation, focuses on detailed pointers to action, such as waste reduction and recycling, and aspects of the current use of resources and environment.

Given the participants' age group (*c*. 16 to 17 years old), their lack of prior exposure to lectures, and their expectations from what is, after all, a *vacation* course, lectures are strictly limited to 30 minutes, including 5 to 10 minutes of questions or discussion. To avoid the distraction of inexperienced note taking, we request speakers to supply brief lecture summaries, which also provide excellent take-away resource material. Many participants subsequently use these for reporting back to schools or for school projects.

Field trips provide a vital experiental link. A major one-day trip embraces both anthropogenic and natural environments. First, on a stop at the edge of the Canterbury Plains (see Figure 1), we examine natural landforming processes. Then we move further in land to the eastern side of the Southern Alps. There participants hear of:

a) the physical environment. New Zealand sits astride the boundary of two tectonic plates and is subject to dramatic geomorphic processes, including rapid mountain uplifts of several millimetres per year - in places, more than 10 millimetres per year - balanced by equally rapid erosion;
b) the biotic environment, including the regeneration of indigenous mountain forest and bushland; and
c) the ''managed' environment, including aspects of New Zealand agriculture.

A second, half-day, field trip is based on a circuit of venues in and around the city of Christchurch, including visits to: the government's radiation laboratory (natural radioactivity and ultraviolet radiation); the city sewage treatment works, as a positive example of pollution-prevention and sound environmental engineering; a government science laboratory specialising in biological control; and the city's Antarctic Centre.

An afternoon practical session enables each participant to select two out of about 12 activities - each of which is described as "hands on, feet on (the ground), or fingers on (computer keyboard)". These activities include the following:

- *Measuring* water quality, effect of trees on microclimate, plant responses to environmental factors, lichens and mosses on trees, response of sheep to temperature changes (a natural choice in New Zealand, which has 60 million sheep for its 3.4 million people!), and the pollution load from woolscour waste.

- *Visiting* sites to illustrate coastal ecology, organic farming, measurement of soil pesticide residues, and gaseous emissions from soil.
- *Computer modelling* of lake pollution, crop growth, fish biology, and insect population dynamics.

In an evening session, staff members lead discussion groups, each one made up of about 14 people. In two EnviroSchools, we have seeded participants with the suggestion that, as a national gathering of New Zealand youth committed to environmental issues, they might consider preparing and submitting a Young People's Charter or statement for the Environment. Enthusiasm for this idea has been overwhelming, particularly from a core group of students. The first charter was conveyed in 1990 directly to the Cabinet and to the prime minister at the time, the Hon. Geoffrey Palmer.

The change in outlook of the participants over the duration of the school is usually dramatic. They accelerate in only four days from an initial state of apparent indifference and uncertainty to a state of enthusiasm, the latter strongly infectious on the staff. From that viewpoint, the duration of the school proves to be just right; a shorter period would adversely curtail the programme, whereas a longer period might risk overplay.

**Outcomes**

Strong testimony to the success of EnviroSchool is given by its results, both during and after the event. The impact on many of the young people is reflected in their enthusiasm and positive support for the EnviroSchool concept. Turning to the flow-on effects of EnviroSchool, the following achievements can be identified.

1. The submission of a Young People's charter or statement not only helps the participants to focus their own views but also sends a firm message to the government that of all those who care for the Earth, the young often care most and that their concerns as inheritors of the present need greater attention.

2. The school has a strong multiplier effect in New Zealand communities. Many of the students return home to form or strengthen school environmental groups and to undertake recycling schemes or other community projects.

3. The impact on the university itself has been substantial. First, in the wake of the school, we formed in 1991 a campus environment group, linked to both the local high school and the community. This group has initiated campus recycling programmes and encourages a wider view of environmental issues than can be obtained from purely academic programmes. Second, the school influences the education programme. It has helped focus the creation of new subjects in the university's degree programme; for example, a first-year subject, 'Global Environmental Issues' was established. In terms of further extension education, we realised it was important not only to 'teach the students', but also to 'teach the teachers'. Hence we also planned and successfully ran in 1991 a three-day course for environmental educators, including high school teachers, to complement EnviroSchool.

4. The school also has a roll-building effect on the university. Some sixty EnviroSchool 'graduates' are now enrolled in the university's undergraduate programmes.

## Conclusions

EnviroSchool, a short but intensive Vacation School for selected high school pupils from throughout New Zealand, has proved to be a potent mechanism for seeding or strengthening commitment to environmental science, ethic and action among a diverse range of young people; ensuring increased environmental awareness of the future work force; propagating education and action into the wider community; " setting the compass" within the university itself; and publicising and roll-building for the institution. The key to the success of the school is a mix of environmental science, ethic, action, and student participation.

Running such a school is particularly appropriate in New Zealand, which must rank as (relatively) one of Earth's least-impacted lands, because of its favourable combination of benign climate, low population (3.5 million over about the same area as the United Kingdom) and short history of development.

Beyond 2000, we are undoubtedly set to enter the millennium of the environment. Universities throughout the world are major contributors to national 'social guidance systems'. They must increasingly assume environmental caretaker and caremaker roles: as care*takers* in their research directions and (for consistency) in domestic campus management; and as care*makers* in their teaching, via both in-house and community education. EnviroSchool puts the university one step along this path to the future. Popular request behooves us to continue running it!

## Acknowledgments

The author is extremely grateful to all who have contributed so willingly to EnviroSchool and helped to make it such a great success for some of New Zealand's most eco-conscious youth. Particular tribute is given to the contributions of Caroline Duncan, Jacqueline Rowarth, Jeff Bluett and Roland Jaspers.

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# Conservation Districts: More Than 50 years of Community-based Conservation in the United States

**Jim Chandler, Oxford County Soil and Water Conservation District**
**1 Main Street, South Paris, Maine USA 04281**
**(207) 743-7019 (work) 743-9734 (fax) 674-2963 (home)**
**email: chandler@gray.maine.com**

## SUMMARY

For more than 50 years the United States has had a decentralized delivery system for helping "land occupiers" implement natural resource conservation practices. This has been accomplished through a network of approximately 3000 local Conservation Districts. In many ways the LandCare program and other conservation groups in Australia parallel the activities of Conservation Districts in the United States. The purpose of this paper is to explore the beginnings and development of Conservation Districts in the United States. The desired end result of this discussion is to learn more about different methods of promoting natural resource conservation and to create a dialogue with environmental programs in Australia.

### Introduction

The following thumbnail perspective of Conservation Districts in the United States has been developed through my 10 year experience as the District Manager/Education Coordinator of the Oxford County Soil and Water Conservation District in Maine (in Northeastern United States). In addition I have learned from personnel of other Districts and the National Association of Conservation Districts (NACD). I have gathered information about the early years of Conservation Districts from a series of books, articles and discussions with long time participants. It is from this perspective that I share with you the organization and role of Conservation Districts in the United States.

### What are Conservation Districts?

Conservation Districts are local subdivisions of state government organized " to coordinate assistance from all available sources -- public and private, local, state and federal -- in an effort to develop locally driven solutions to natural resource concerns" within a watershed or county area. (NACD, 1996) Districts are empowered by state law and are directed by a board of local supervisors. Districts design their programs as independent entities but often have strong connections to federal, state, and local governments. Programs of Conservation Districts vary widely depending on the local conservation needs. Some examples include soil erosion projects on farms, water quality demonstrations, educational programs, technical assistance to landowners, forestry advice, urban programs dealing with erosion and sediment control and stormwater management, water conservation in irrigation, and wildlife habitat restoration.

### How Conservation District got their start:

Similar to LandCare efforts in Australia, Conservation Districts have their beginnings with dust **storms**: "The spring of 1935 was not a very cheerful time in America. A Great Depression had the Country in its grip, and the problems of jobless, homeless people preoccupied the nation's leadership. To make matters worse, the Midwest was going through a serious drought, and wind-blown topsoil from Texas and Oklahoma had been seen as far as 300 miles out in the Atlantic Ocean." (Sampson, 1985, p.1) It was in this time, we called "the Dust Bowl" that Conservation Districts had their beginning. As a result of the Dust Bowl, the Federal government decided they needed to take steps to conserve soil resources. To this end the Soil Erosion Service was organized as a federal agency. In fact, when Hugh Bennett, the first head of the service, testified to Congress he timed his presentation with the arrival of dust from a storm. "Slowly, he proceeded through his material, all the while hoping that the storm would hurry up and arrive. Finally, the room began to darken. As the Senators, staff and assembled witnesses gathered at the window, the billowing, roiling clouds of soil blotted out the sun, and the fine grit could be felt between the teeth....The result, of course, was that Congress speedily passed Public Law 46, the soil conservation act." (Sampson, 1985, p.1)

The Soil Erosion Service started running demonstration projects around the country. These demonstration projects proved that erosion control techniques worked. However, a delivery system was needed to provide technical assistance directly to landowners; involving landowners without them feeling like the federal government was imposing regulations on farmers. (Sampson, 1985, p. 20) At this time the idea of Conservation Districts was born. M.L. Wilson, Assistant Secretary of Agriculture, thought that a local entity similar to conservancy districts, special districts responsible for water projects, would do the job. (Helms, 1990, p. 14)

A Standard State Soil Conservation District Law was composed describing the basic structure of Conservation Districts that has proven effective to this day. This Standard Law, drafted by Philip M. Glick, was sent in 1937 to each state to enable the development of a delivery system for conservation assistance across the country. By 1947 all the states and territories of the United States had adopted versions of this law. Many of the states modified the law to fit the needs and desires of their area. As a result there are nearly 3000 Conservation Districts across the United States. It is instructive to look at various aspects of the Standard Law to understand how Conservation Districts generally function, although programs vary greatly from state to state and even for each Conservation District.

### Standard State Soil Conservation District Law

The structure of the Conservation District needed the involvement of local landowners to be effective. In order to accomplish this the Standard Law proposed that Conservation Districts be a local entity "established by a majority vote of approval by the farmers in the proposed boundaries of the district. ... Let no district come into existence unless the farmers want it and approve it in a formal referendum... Let the district be governed by supervisors whom the farmers themselves will elect." (Helms, 1990, p.25) Not only were the farmers and other interested parties responsible for forming the District but they would have the power to govern this local entity. The Board of supervisors usually was comprised of 5 supervisors. Three of the supervisors were to be elected and two were to be appointed by the state. It was thought that the appointed supervisors would be people who had some technical knowledge of conservation issues. (Helms, 1990, p.41) In addition Districts were given "complete authority to plan, to develop erosion control plans that are district-wide." (Helms, 1990, p. 25) This independence has been very important to the success of Conservation Districts. It has allowed districts to develop program and implement solutions with a minimum of red tape. It has also permitted districts to have a strong emphasis on grassroots solutions and not acting as an agent of the government.

A key part of this legislation set up a close partnership between the Conservation District and other organizations. Districts were organized as local entities. However they needed help with technical assistance and the tools required to carryout conservation programs. Rather than provide federal funds directly to Districts, the legislation sets forth a relationship whereby the federal government would provide technical staff for each District and equipment to help apply erosion control methods to the land. Provisions were included for states to provide administrative funds through an annual appropriation. (Helms, 1990, p. 53-54.) Districts were to be connected to the states with a soil conservation committee (A Soil and Water Conservation Commission) made up of representatives from districts, the federal government through the Soil Conservation Service, and the state, as well as other resource agencies such as the university extension service, and agricultural experiment stations. (Helms, 1990, p.34.) In addition, districts have strong ties to county and local municipalities and local landowners. In this manner Conservation Districts were organized to promote partnership on an unprecedented scale. In recent years this has placed the District in an excellent position to help coordinate and mediate solutions to environmental issues by bringing together the resources and expertise from many different parties.

The financial arrangements laid out in the law have kept Conservation District programs very cost effective and efficient. However in many cases the overall funding for their programs has been weak and is one of the major impediments to districts reaching their full potential. Some areas, as we will discuss later in this paper, have further developed District funding. However in many regions of the country this is a continuing problem.

Another key provision of the original organization is the primarily voluntary nature of the assistance provided by Conservation District. The Standard State Soil Conservation District Law did provide some regulatory powers to districts. However the emphasis right from the beginning has been on voluntary demonstrations and the application of conservation practices with landowner cooperation. Some states, such as Maine, dropped the regulatory powers completely from their version of District Law. In some cases regulatory powers were deemed necessary to deal with landowners who choose to ignore the concerns or assistance of the Conservation District. However, the primary means of operation of districts continues to be voluntary assistance. In this way, the relationship with landowners is based on mutual cooperation rather than cohersion or compulsion. This has allowed Districts to gain the respect of many landowners where regulatory agencies have been kept at a distance.

A key concept set forth in the suggested legislation was the concept of a "land occupier", "any person, firm, or corporation who shall hold title to, or shall be in possession of, any lands lying within a district organized under the provisions of this act, whether as owner, lessee, renter, tenant or otherwise." (Helms, 1990, Appendix, p.4) This made conservation the responsibility of "anybody who conducts operations on the land." (Helms, 1990, p.33)

Through these key provisions, with wide ranging project powers and limited regulatory powers, the Standard State Soil Conservation District Law set in place a system that has been effective in promoting the direct application of conservation practices by "land occupiers". A very complete description of this law and how it was carefully crafted can be found in *The Preparation of the Standard State Soil Conservation District Law.* (Helms, 1990.)

### Conservation Districts Today

Over the years the basic organizational design of the Standard State Soil Conservation District Law has withstood the test of time and has contributed to the strength of districts. The flexibility of the structure has allowed Conservation Districts to grow and change with the times and needs of each locality. As a result the district movement in the United States continues to grow and flourish.

A summary of the range of District activities can be seen in the 1993 edition of the *Conservation District Program Authorities*, published by the National Association of Conservation Districts. According to this source " Over the past 20 years, 26 states and the District of Columbia and the U.S. Virgin Islands have enacted significant provisions to strengthen their erosion and sediment control legislation." Despite these changes the original structures remain generally intact and continue to expand their functions.

Of the 50 states, District of Columbia, and 4 territories served by Conservation Districts, nearly all have Soil and Water Conservation Commissions as part of state government either as independent agencies or part of the departments of agriculture, conservation, or environmental protection. Representatives on these commissions range from District Supervisors, farmers and ranchers, state and federal agency representatives, and urban or nonfarmer representatives. The grassroots nature of Districts and Commissions is underscored by the statistic that only 15 states give compensation to members of their commission. "More than 15,000 volunteers serve in elected or appointed positions on conservation districts' governing boards. They work directly with more than 2.3 million cooperating land managers nationwide, and their efforts touch more than 778 million acres of private land." (NACD, 1996)

Districts have a wide range of powers, depending on the state. Some of these are in the original District Law and other powers have been added. These include district-wide conservation planning, building and maintaining structures, cooperation with other districts and agencies (inside the state and across state boundaries), acquiring and administering projects, imposing conditions for furnishing assistance, the right to sue and be sued, eminent domain powers, the review of subdivision and other earth moving plans, and conducting research and surveys.

The functions of conservation districts also continue to expand including soil conservation, flood prevention, water management, irrigation management, recreation, water supply, pollution control and sediment prevention. In addition to these programs mentioned in the legislation Districts have developed many education programs, watershed projects, urban conservation efforts, farmland preservation initiatives, forest management activities and integrated pest management service.

In many districts the only employee has been a District office manager who served as program assistant, secretary, bookkeeper, and a myriad of other functions. As the mission has grown so have the range of employees. Many Districts now employee engineers, technicians related to watershed projects, foresters, educators, nutrient management specialists, hydrologists, and pest scouts. This also reflects the wide range of landowners that Conservation Districts serve. In the early years the programs of Districts served farmers, almost exclusively. Since that time the number of farmers has changed and the range of conservation concerns addressed by districts has increased. Now Districts often work closely with municipalities in erosion and sediment control plans, lake associations and sports groups on water quality programs, teachers on a wide range of education programs, road crews and developers on erosion prevention and stormwater management, multi-state programs like the Chesapeake Bay Program, and many other conservation concerns.

To deal with these concerns some of the new tools that have been developed include the approval of plans in areas of soil disturbance, the development and promotion of best management practices, cost-share programs, establishing soil loss limits and a wide range of education programs. However the traditional form of operation still remains strong: providing landowners with technical advice in cooperation with the Natural Resources Conservation Service (originally the Soil Erosion Service, which became the Soil Conservation Service). This also includes the development of conservation plans and providing cost share assistance.

As programs have grown, so has the need to develop additional funding sources. Conservation Districts generally receive some state funding and federal assistance in the form of technical personnel and often office space. In addition, Districts often receive funds through grant programs such as 319 funds for watershed projects from the United States Environmental Protection Agency under the Clean Water Act. Many states have also developed their own cost share programs in addition to the cost share programs provided by federal programs. These programs encourage practices such as water pollution prevention, farm land preservation, the purchase of conservation equipment, range improvement, and wildlife management. (NACD, 1993) Some states also allow districts to levy taxes or assessments on landowners, borrow money, issue bonds and receive matching or revolving funds. The development of sedimentation and erosion control laws for development have also led to fees for service programs to review these plans. Many districts also have other fees for service programs for programs such as foresters, pest and crop management specialist or other programs. Districts also have had a variety of fundraising activities such as annual tree and shrub sales, equipment rentals and membership donations.

One of the ways that Districts have kept up with the changes has been to band together through the National Association of Conservation Districts, organized in 1946. "The mission of NACD is ' to be an advocate for and to empower the nation's conservation districts to facilitate the harmonious use of our natural resources.' Among the goals of the organization are to: Represent districts as their national voice on conservation issues. Provide useful information to conservation districts and their state associations. Build partnerships with federal and state agencies and other organizations in order to carry out district priorities and programs. Analyze programs and policy issues that have an impact on local districts. Offer needed and cost-effective services to districts." (NACD, 1996) Some examples of programs they have developed include information sharing at annual regional and national conventions, the development of resources such as the Conservation Technology Information Center, CTIC, providing information on innovative conservation techniques for farmers, and the Urban and Community Conservation Network.

**Case Studies of District Activities**

Some specific examples of how Conservation Districts have adapted to changing times can be illustrated by some examples from specific states.

**Nebraska**

Probably one of the most dramatic overhaul of Districts occurred in Nebraska in 1972. At that time the legislature combined 154 special purpose entities into 23 Natural Resource Districts. The boundaries of these districts was roughly along watershed boundaries rather than county lines. The Districts were given "broad responsibilities to protect natural resources" combining the responsibilities of the various entities that existed prior to this time. In this manner Districts were used to consolidate a wide range of programs under one umbrella organizational structure. "Since they were created, NRDs have experienced tremendous growth in the responsibilities given to them by state statue, especially in protecting groundwater." The range of programs include: water supplies, water quality, water pollution control, flood and erosion control, soil quality and range management, wildlife habitat protection, tree planting, urban

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conservation, conservation education, and recreation. With this growth and change in structure also came a new stable form of funding. "Much of their funding comes from local property taxes (which the Districts have the power to levy)." Typically the rate of tax is around 1-2 percent. (Nebraska Association of Resource Districts, 1996 )

**Pennsylvania**

Conservation Districts in Pennsylvania are involved in a wide range of conservation programs. They are also examples of how some Conservation Districts are cooperating with state regulatory agencies. Under the Chapter 102 program of Pennsylvania regulations, districts review erosion and sedimentation control plans for construction sites. In addition under the Chapter 105- Water Obstruction and Encroachment program, Conservation Districts issue free permits for activities such as Fish Habitat Enhancement Structures, ... Temporary Road Crossings, and Agricultural Activities. The Fulton County Conservation District 1995 Annual Report explains the process: "Some stipulations exist on the various permits. When complaints are received by the Department of Environmental Protection, DEP calls us (Conservation Districts) with the information and we do the initial inspection to determine if a violation exists or not. If a violation exists, DEP enforces the penalty." The Conservation Districts in Pennsylvania are involved in the regulatory process but not the enforcement. Likewise Conservation Districts are often able to work with the landowner and regulatory agencies to find acceptable solutions, eliminating the need for enforcement actions. In addition to these programs Fulton County Conservation District participates in the Chesapeake Bay Program, a multi-state program to reduce non-point pollution into the bay. They have a technician funded by this project and provide technical assistance and financial assistance to landowners in their area to implement best management programs to help clean up the Chesapeake Bay.

Conservation Districts in Pennsylvania are also responsible for starting Envirothon, an environmental competition for high school students. Teams of 5 students from high schools participate in hands-on, problem-solving tests in the areas of soils, water, wildlife, forestry and current environmental issues. The issue changes each year. Also at the national competition teams study one problem in detail and make a presentation on this topic to a panel of judges.

# Community Education for Waste Reduction: A Review of Education Programs in NSW

**Grahame Collier**
**NSW Environment Protection Authority**

## SUMMARY

Limiting the waste of resources is a key challenge for the Australian community. This paper reviews the role and impact of community education in reducing waste in NSW. The level of community readiness for reduce, reuse and recycle messages is discussed and the challenges and opportunities for future education about waste are identified.

## INTRODUCTION

Education of the community about improved waste management practice has been a major focus of the environmental initiatives of government at all levels, over the past 15 years. In NSW, education efforts have included campaigns [eg, "Do the Right Thing" and "Solutions to Pollution"], curriculum and teaching/learning materials in schools and TAFE, face to face community education programs [eg Earth Works], and information/education about recycling and garbage collection services. Some of these will be discussed in more detail later in this paper.

Tracking the key messages of these programs over time provides an interesting view of how the concept of waste management has grown and changed in this country. We have moved from the earliest efforts, which were more about the management of the litter problem than the management of waste, through to education to promote recycling behaviours. More recently community education has focussed on encouraging the reuse of products and materials, composting and even waste avoidance behaviour. It is clear that if education has a significant future role in minimising waste it must address the resource use issues and encourage people to avoid generating waste in the first place, rather than merely focusing on the disposal end of the equation.

In NSW community education is an important component of our efforts to deal effectively with the waste we generate. Education, however, is best used as an approach integrated with other environment protection tools such as regulation and economic incentives.

Within this context, this paper will focus on the following objectives.

- To review some of the community education programs conducted in NSW to reduce waste.
- To identify the opportunities for, and barriers to, behaviour change that education about waste must consider.

- To outline the social context in which waste education occurs.

## WASTE AND THE NSW COMMUNITY

The NSW community understands that the waste that we generate is a major concern. In 1994 the NSW Environment Protection Authority (EPA) conducted a state-wide face to face survey of householders in NSW, the *"Who cares about the environment"* study. The key results of this study that provide us with some information about the waste issue were:

- the NSW community ranks waste as a high priority issue (third in line behind air quality and water quality);
- the NSW community ranks waste as the major issue over which they personally have some control;
- waste is seen as the area of environmental change where individual householders have done most (particularly with regard to recycling, mainly in the suburban areas where kerbside collection is provided).

In rural NSW, people felt very positively disposed to their local environment. Over 90% of people in small towns and rural areas and over 85% of those in large towns rated their environment as either very good or fairly good. This compared with only 78% in Sydney and 79% in Wollongong and Newcastle. The level of concern about waste management was significant, as people in rural areas emphasised waste management as an issue more than those in the remainder of NSW. There were, however, some variations in people's behaviour to reduce waste. City people recycled more [this appeared to be because of reduced choice to undertake extensive recycling activity in rural areas]; people in larger towns, small towns and on properties, knew how to compost organic material and composted more often than those in the city.

The EPA is currently planning a follow up survey to *"Who cares about the environment"*. The results of this survey will be available prior to mid 1997. These results will allow for an analysis of trends over time to be commenced.

It is clear then, that a significant number of people are aware that waste is an issue. While this has translated into significant recycling behaviour, the impact on the waste stream has been somewhat limited. The NSW Government has mandated under the Waste Minimisation and Management Act 1995 [WM&M Act], the goal of a 60% reduction of waste to landfill by the year 2000 [with a baseline of 1990]. To date the NSW community is producing about 85% of the waste it produced at the beginning of the decade . This would indicate that there is still much work to do to achieve such a significant waste reduction goal.

## CHALLENGES AND BARRIERS

The challenge for education and indeed for the other waste minimisation tools, is to guide people to translate their perception that waste is a major issue into actual behaviour to reduce waste. The NSW WM&M Act places waste management approaches within a descending hierarchy of activity ranging from the most important, reducing resource usage, through re-using products, recycling materials and as the final option, disposing of material/products as waste to landfill.

If gains are to be made with the community then education has an important role in helping people to see that much of what is currently disposed of as waste is not really waste at all. For example:

- People can change their purchasing behaviour to buy only what they need and to avoid the generation of waste by not buying disposable products.
- Organic materials can be composted and mulched;
- Clothing and furniture can be re-used by others;
- Many products (paper, cardboard, plastic, aluminium) can be recycled if a system is in place to collect and market them;

These relatively simple shifts in behaviour can be promoted by education which:

- increases people's knowledge about waste and how it might be reduced;
- improves people's skills as waste manager at home, and at work (eg teaches them to compost/to use mulch/to sort material for recycling, to purchase only what they need);
- assists people to re-use products that are re-useable;
- helps people to become more motivated towards sensible use of resources and to value those resources more.

No one educational approach will be successful with all people and it is only by working on knowledge, skills and attitudes that successful outcomes will emerge. It is imperative that all those who are delivering community education about waste assist the target populations of each program to reduce, re-use and recycle rather than merely focusing on one aspect of the waste reduction equation.

From the range of programs and research carried out in NSW, it is possible to identify a number of barriers to community education about waste minimisation. These may be summarised as follows:

- The community norm that has been created to recycle. While recycling is a positive waste minimisation activity, it appears that many of those people who recycle are convinced that they are doing enough to reduce waste.

- The consume, consume, consume society that we all live in. Reduction of resource use messages can easily get lost in the multitude of consumption messages that people are enveloped in.

- The need to know why. Before most people make difficult lifestyle related behaviour changes, they want to know why. It is clear that while the government has set a reduction in waste to landfill as a goal, this message is not accepted by many in the community as a reason for changing their behaviour. The issue of wasted resources is a much more palatable reason for change.

- At work and at home. For many people there has not been a translation of waste minimisation behaviour from home to work. For example, people recycle at home but not at work and often purchasing behaviour is less wasteful at home.

The best way to amplify the challenges and barriers to effective waste education barriers to waste education is to consider three examples of programs conducted at a state wide level. In outlining these it is acknowledged that often the best results are achieved by locally owned and developed programs and that state-wide initiatives often set the context within which local programs can occur.

### 1. The Litter Reduction Campaign

The Litter and Recycling Research Association [LRRA] is a national beverage industry association which conducts the "Do the Right Thing" campaign in NSW. This campaign was conducted between 1981 and 1994 and achieved a 70% reduction in the level of litter in public places [as measured by the NSW State Pollution Control Commission's Litter Index in 19888]. The campaign provides technical and promotional support to Councils across NSW, particularly in relation to public place recycling programs.

### 2. Solutions to Pollution Campaign

In 1994/1995 the EPA conducted a mass media/community education campaign about waste and stormwater pollution. The key waste related products of this campaign were:

- a television commercial;
- newspaper advertisements in metropolitan, suburban and regional newspapers;
- a state-wide brochure inserted in the Sunday Telegraph and distributed widely around the state;
- an advertised 1800 number;
- school education materials;
- a pilot community education program for small business and local government [conducted in conjunction with the Shoalhaven City Council];
- a specific NESB targeted program in six languages;

The campaign promoted reduction of waste by encouraging avoidance and re-use of products and recycling/composting. The campaign was evaluated by using pre-test and post-test surveys of 500 residents throughout NSW. The key results were as follows:

- People indicated a desire to recycle more often and in greater quantities [64% prior to the campaign up to 83% post the second phase of the campaign]
- People were composting more [30% prior up to 40% post the campaign]
- The desire to use refillable/recyclable packaging increased from 7% to 15%.
- Following the campaign only 20% of people indicated that they probably would not use their own shopping bag compared to 33% who said this prior to the campaign.

The television advertisement had significant reach into the community. 54% of people surveyed in rural NSW recalled seeing the advertisement and of these 87% described it as very convincing.

The EPA is currently planning a follow up Solutions to Pollution campaign.

### 3. The Earth Works Program

The EPA recently launched the Earth Works Program for implementation throughout NSW. This is a community education program which provides 25 hours of training for community volunteers about waste minimisation. Following this training Earth Workers are encouraged and supported to conduct education outreach into their communities about waste issues. Earth Works was developed and piloted by the EPA in 9 Councils.

Earth Works materials have now been sent to all Councils and Adult and Community Education [ACE] providers in NSW and they are encouraged to use them to deliver the programs. The EPA has registered over 40 trainers to deliver the Earth Works program and it may only be taught by these trainers. Courses may be conducted on a fee paying basis or subsidised by the local community/council.

Councils involved in the pilot of this program have found that it assists them to engage closely with their communities. As each group of participants delivers outreach into their community the council has at its disposal an unpaid work force supporting their waste reduction goals. Those councils involved in the pilot program reported, to their surprise, that their Earth Workers became so involved in the project that many of them have delivered thousands of unpaid hours of education.

Canterbury Council in Sydney was an Earth Works pilot council. They are now acknowledging a 10% reduction in waste to landfill and a 30% increase in recycling because of the activities of their Earth Workers.

Earth Works is an example of a community education program which was developed at the state level which now has the capacity to grow locally. The EPA will be happy to provide additional material about the Earth Works program to those who are interested.

**Conclusion**

In conclusion, the reduction of waste is an important community goal. Community education at all levels which is planned fully and evaluated extensively is an essential aspect of the range of approaches to achieving that goal.

# Bangor Landcare in Action
# Engendering a Natural Relationship.

**Carolyn Daly and Tom Dunbabin**
Bangor Landcare,
Dunalley, Tasmania

## SUMMARY

Providing students with learning experiences that teach them to respect and understand the natural environment is critical to both their future and the future of nature conservation. *Bangor Landcare in Action* has been developed by a farmer and an artist with teaching experience as one such learning experience. Based on the philosophy that it is vital to learn about the environment in which we live and work, this programme covers the diverse range of environments found on a working farm.

Teaching packages comprising both attractive and stimulating worksheets for the students and teacher information have been developed. These are based on four themes; farming, the coast, native bush and history.

In the two years since development, despite having over 600 students participate in the programme, there are a number of limitations to this type of programme.

## Introduction.

*Bangor* is a 6000 Ha grazing property and *Landcare* is the term of the 90's for looking after the land. The connection between the two is readily apparent, and indeed the farming practices at Bangor have for four generations, since the late 1800's in fact, been fine examples of what in the 1990's, Landcare is all about.

For many years visitors have come to Bangor to admire the beauty, and explore the natural and cultural history of the area. Located within one hour of Hobart Bangor has a range of bushland and coastal environments, as well as being a progressive farm. (Fig I)

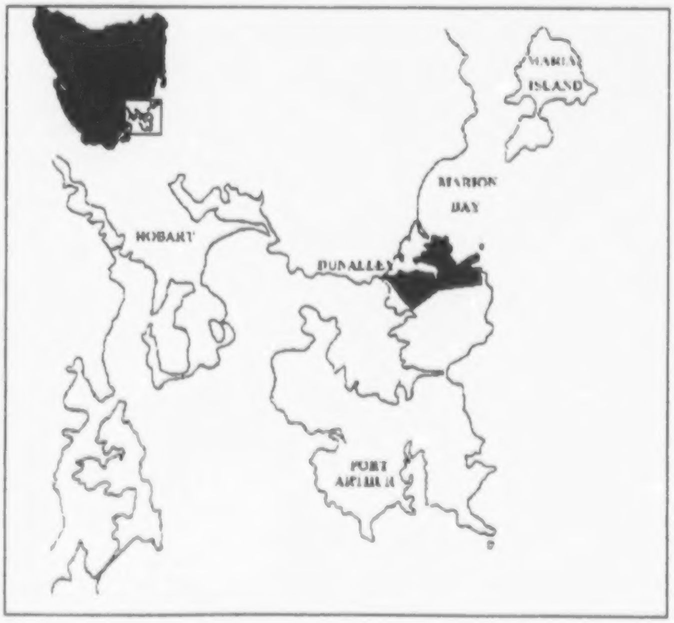

Fig I. Bangor - in Tasmania's South East

The Dunbabin family management philosophy for farming is to work with nature, rather than against it, and visitors see the environment very much in its natural state.

With this natural teaching resource, a background in science and an enthusiasm for working with children, Tom and Cynthia Dunbabin undertook to establish a *Landcare* learning programme at Bangor in 1993.

**The birth of 'Bangor Landcare in Action'.**

Tom had a long held view that much of the environmental education material for students, particularly primary and infant students, tended to be rather unimaginative and unattractive to the students, and consequently was not being used in classrooms. He also believed that much education material viewed Landcare as repairing or remedial, and overlooked the very important caring and preventative aspects.

Prompted by an advertisement calling for proposals for innovative learning projects, Tom approached Carolyn Daly to see if she was interested in developing a Landcare teaching package. Carolyn was a good choice. She had considerable experience as a classroom teacher, and was a creative artist and illustrator. By combining Carolyn's skills with Tom's depth of knowledge and understanding of Bangor's environments and his scientific training, *Bangor Landcare in Action* was formulated and officially launched in November 1994.

The programme logo (Fig II) was an important step in the development process. It symbolizes the themes, and most importantly the connections between them by representing them as being together on the one piece of paper.

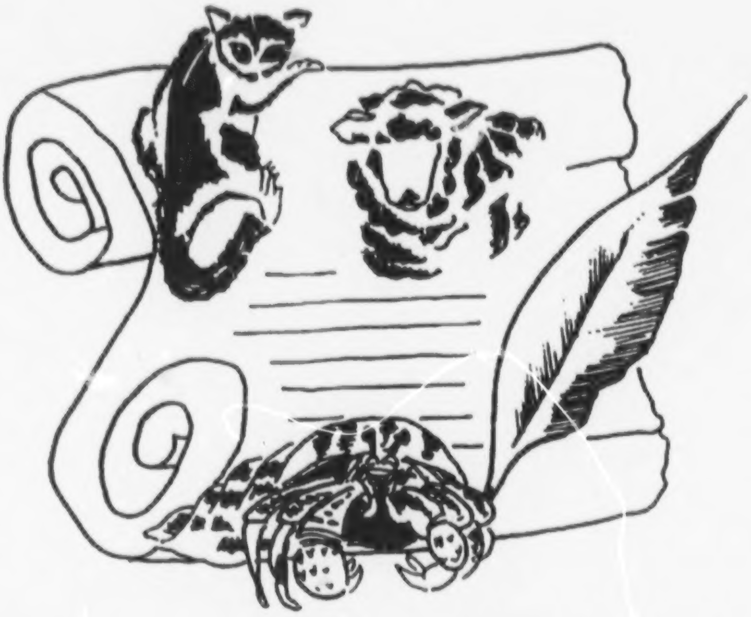

Fig. II The Bangor Landcare in Action logo illustrating the four themes of the programme

The programme is based on a philosophy that encourages not just looking, but really seeing and experiencing. It is based on the premise that "giving knowledge, allowing creativity and encouraging imagination provides a reason to care". If Landcare is to be ongoing and truly successful the reason to care is essential

## What is Bangor Landcare in Action.

Bangor Landcare in Action is a complete teaching package comprising lead up classroom activities, field trip exercises and worksheets and follow up activities. It provides a well rounded and fully self contained unit of work. The four separate themes: Farming, The Coast, Native Bush and History, can be taken separately, or parts of each combined. The detailed content of the teaching programme is formulated with the class teachers involved, to enable it to be incorporated into their teaching theme. The material is readily integrated into the National Curriculum and units have been developed to cover bands A to D.

Innovative techniques such as the use of puppets to introduce the coastal, native bush and farming themes are used. These not only attract and maintain the interest of students, but also enable the concepts being taught to be placed directly into the environment to which they relate.

The teaching material created by Carolyn can be readily used by teachers, irrespective of their previous Landcare experience, and the wide range of activities included in the worksheets gain and maintain the students interest.

"Learning about the environment in the environment"

Each sheet has been presented in an aesthetically pleasing way, with many illustrations which students can embellish with their own decorating skills. The activities included encourage a variety of skills to be utilised: observing, recording, puzzling, word finds, drawing, sketching, collecting, word studies, matching, labeling, cutting, pasting, discussion, forming conclusions, designing, investigating, problem solving, reading, mapping, imagining, diary entries, role playing, creating, thinking and formulating opinions.

The programme is designed to be self supporting in the sense that it must be financially viable from the fees paid by participating classes. We see this as important in order that the programme is responsive to the needs and wants of students and teachers and that it is independent of outside funding, the continuation of which may be determined by factors other than the effectiveness of the programme itself.

## Measuring success.

In measuring the success of a programme such as this we must look at our first hand experiences with the children as well as its overall effectiveness.

When a child, coming from a predominantly urban environment, and living in the age of instant entertainment, walks through the bush and on reaching the rugged coastline exclaims "wow" or "awesome" you know you have a resource that needs to be shared and learned about. When groups of children become so totally absorbed in their surroundings and discoveries that they are too pre occupied to eat their lunch, you know the messages you are endeavoring to teach are the ones this generation wants to know about. No matter what the background of the children, urban or rural, they all desire to claim the natural environment as their heritage. *Bangor Landcare in Action* demonstrates to them that to enjoy the natural environment they must acknowledge the need to take responsibility for it.

Since being launched the programme has reached over 600 students from a variety of schools, mostly in the south of the state and mostly private rather than public. We recognise that it takes time for a programme such as this to be recognised and used by teachers, and are pleased that schools are participating. However in order to be effective in spreading the message that Landcare is something every one needs to know about, we need to reach far more students.

## Limitations of the programme

The programme has evolved and developed in response to the needs of schools, teachers and students. There remain however a number of factors that limit its impact.

The greatest limitation is the cost of bus transport to Bangor, (which exceeds the cost of the programme of $5.00 per student with a max. of $200 per group), and the time taken to get here. We are now developing teaching packages that can be used in the classroom whilst utilising natural areas that are within walking distance of most schools. It is important to have the students working in the outside environment to fully appreciate and understand the need for conserving natural systems.

If accommodation was available at Bangor this would help to alleviate the traveling time and the programme could be developed to cover more than one day. The cost of constructing and maintaining accommodation facilities would however make the programme expensive and probably non-viable.

Bangor Landcare in Action
Learning to Care!

## Conclusion.

'Bangor Landcare in Action' is a successful environmental education programme that imparts a love for, and an understanding of, the natural environment. The emphasis is on learning about nature, the plants and the animals, and how they interact. The programme provides an understanding of our place in the environment, a place to live, a place of work and a place for leisure and recreation.

# Environmental Education In Early Childhood: Exploring the Links

**Sue Elliott**
**EEEC**
**PO Box 55**
**Reservoir, VIC 3073**

## SUMMARY

The professional interest group Environmental Education in Early Childhood (EEEC) has established supportive links between early childhood professionals implementing Environmental Education. Further, EEEC has developed links with other professional organizations and community groups resulting in a range of resources and programs. This session will provide an illustrated overview of this work.

## INTRODUCTION

The professional interest group EEEC was established just prior to the Perth conference of AAEE in 1992. At that conference, a number of initiatives in early childhood environmental education were described as an exciting beginning. It can now be reported that all but one of those initiatives reached fruition and that many more have been undertaken.

### Links - The Basis of EEEC

1. The EEEC group was established in response to interest created by professional development workshops in environmental education and the publication of the book "Snails Live In Houses Too - Environmental Education for the Early Years" (Elliott and Emmett, 1991). Early childhood educators were attempting to implement environmental education at the early childhood level but needed support to do so. Regular informal meetings emerged to provide support, resources, networking and problem solving for members. The links developed through meetings have been a strength of the group thus far. More recently, the group has established a professional library for members.
2. The philosophy which underpins these links, is based on the notion that fostering of a positive attitude towards the environment must occur at an early age in order for a child to develop into an environmentally responsible and sensitive adult. EEEC aims to promote a wholistic approach to environmental education at the early childhood level. This approach involves policy development, housekeeping practices, play experiences and strategies for working with children, staff and parents. EEEC actively promotes environmental education at the early childhood level through workshops, lectures, conferences, consultation and publications. Of particular note are two publications, "Playing For Keeps" (Gordon Child Care Centre, 1993) and "Just Imagine - Creative Play Experiences For Children Under Six" (Crook and Farmer, 1996)
3. While most EEEC members are located in Victoria, there are some members interstate and this has led to the establishment of a sister group in Queensland called Queensland Early Childhood Environmental Education Network (QECEEN). Also, another group may be established in Canberra in the near future.

**Community Links**

1. In 1994, the Victorian Playgroup Association and EEEC linked to produce a brochure entitled "Environmentally Responsible Playgrouping". The brochure outlines philosophy, play materials, housekeeping practices and resources relative to playgroups. The process was stimulating for all concerned and involved many hours of discussion about rainbow rice and the dilemma of using food as a play material.
2. At East Bairnsdale Kindergarten, Jo Nunn conducts an environmental education program for pre-school aged children entitled "Woolly Wombats". The program provides an interesting, alternative extra-curricula experience for children in the local area and operates for 3 hours each week over a 6 week period. A strong focus of the program is the involvement of families. On a weekly basis, families collect materials for the program and undertake informal experiences at home e.g. observing wildlife, discussing conservation issues, recycling etc. Also, parents are encouraged to participate in excursions to local sites of interest.
3. More recently ASHE an inner urban community group which has a strong environment committment has worked with local parents and EEEC members to establish an environmentally responsible toy library. The philosophy statement of the ASHE Toy Library (ATL) states:

   > "A major emphasis will be to provide toys that are made locally from natural, re-usable or recycled materials which will have the potential to lay the foundation for environmental education. The choice of toys will be such that non-violent, cooperative and creative play will be encouraged."

   The toy library was funded by a grant of $3000 from local council, but with membership fees and some fundraising will become self-sufficient. The voluntary parent committee brought together a range of opinions about what constitutes an environmentally responsible toy library and many issues were debated. Toys were selected on criteria such as locally made, second hand, made from renewable resources or reusable materials. The toy library has been operating since September 1996 and appears to be providing a toy lending service as well as informing parents about environmental education.

**Professional Links**

1. An initial issue for discussion among EEEC members was the use of alternative cleaners in early childhood centres. Although much anecdotal information had been collected, in 1993, EEEC invited Swinburne University Environmental Health Officer students to investigate the microbiological effectiveness of alternative cleaners. This research resulted in a report entitled "An Investigation into Alternative Disinfectants" (Dobson and Kibbis, 1993) and provided a recipe for an effective and economically viable alternative cleaner. However, this issue is under constant review due to factors such as:
   - non-prescriptive children's services regulations with respect to cleaning
   - growing awareness of toxic and allergic reactions to chemicals
   - hygiene conscious staff, parents and management
   - the high risk of cross infection in early childhood centres
   - concern about transmission of AIDS and Hepatitis-B.

   Further research is imperative if safe, effective and environmentally friendly cleaning agents are to be employed throughout early childhood centres.

2. EEEC has also established professional links with extension education services in Victoria. Two resource kits have been produced "Bright Eyes and Bushy Tails" developed by Kim Godwin at Healesville Sanctuary in 1992 and "The Octopus' Garden" developed by Cheryl Linford and Jacinta Farrugia at the Marine Discovery Centre in 1996. Both kits are aimed at children 3-8 years and contain a range of artifacts, photographs, puppets, animal models, books and puzzles which can be used in a variety of ways according to the needs and interests of children. In addition, a number of extension education services now conduct early childhood programs such as Melbourne Zoo, Botanic Gardens and the Marine Discovery Centre, and EEEC is currently attempting to establish a network of educators involved in these programs. It has become evident that working with early childhood groups in these venues is challenging and requires a particular understanding of their developmental needs.
3. A number of EEEC members are teaching in tertiary early childhood training courses and informally promote environmental education. In recent months, more formal links have been made through staff development and submissions to Course Reviews. The prospect of all staff in early childhood training courses promoting environmental education and there being a core subject in environmental education for all students is inspiring.

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# THE DEVELOPMENT OF PEDAGOGICAL THEORY FOR ENVIRONMENTAL SCIENCE AND MANAGEMENT STUDIES

*Dr. Raimonds Ernšteins*
*Centre for Environmental Science and Management Studies,*
*University of Latvia*

## *1. Introduction*

Environmental problems are dynamic and often contain some uncertainty revealing only in the course of time having a delay between causes and effects. They have a social character thus reflecting the interaction between individuals and social and natural environment. Therefore it is insufficient to acquire basic knowledge only in ecology and nature protection. Environmental specialist - would it be environmental manager or scientist, environmental sociologist or engineer - should acquire interdisciplinary knowledge and skills to act in the environmental problem-solving critical situations which would require also unordinary decisions. It is assumed that in order to find and implement the best problem solutions it is necessary to have appropriate training which could be best developed by direct participation in problem-solving processes - practical or simulated ones.

This paper will review the results of the environmental education research programme aimed to develop an interdisciplinary and interactive teamwork training of environmental management specialists as a key actors nowadays in Latvia acting for elaboration and dissemination of information to both decision makers and public at large in the same time out to be generalists of environmental protection and management project work for solving, predicting and avoiding environmental problems. During educational experiment (1993-1995) the study content and forms of two subsequently designed MSc programmes on Environmental Science and Management have been tested to create an optimal model. The ***pedagogical theory of environmental science and management*** studies has been developed - the paradigm of the studies, paradigmatic approaches and method, conceptual scheme as well as the didactic principles and methods. Recommendations are elaborated for further development of environmental science and management as an ***interdiscipline in the universities*** by creating relevant academic and professional study programmes. (Environmental impact assessment and inspection, environmental planning, pollution prevention and waste management, environmental communication).

In the relation to the theme of the conference it is important to mention that also ***MSc programme on Environmental Pedagogy (Education)*** has been elaborated on this base. Being in test during last study year, it is aimed to train teachers not only with natural sciences but also social/humanities background to work on integration of Environmental Education (EE) into school curriculum as well as introducing new subject line "Environmental science and "Environmental studies" at different grade levels, which, according to the author, are both required elements for building up the EE system in Latvia as a country in transition.

In both cases of mentioned academic study programmes as well as in the proposed professional ones, the main thesis is that studies should contain not only theoretically known but also practically understood and perceived acquaintance with the reality of ***interrelations between natural and social environments*** importantly stressing each persons itself life-long activities in relation to that.

### *2. Background of the programme*

Starting with the nineties, more and more environmental aspects are included in the study programmes of the University of Latvia, including the development of several academic programmes on environmental science. The interdisciplinary training of environmental managers with broad perspective in the frame of the MSc studies on environmental science and management was developed at the University of Latvia in 1992/93.

Research on environmental studies is rarely found in the international references however conferences for exchange of practical experiences are taking place more and more often. The situation is characterised by the empirical experience of the co-ordinators of different multi- and interdisciplinary programmes, for example, De Groot (Leaden University), B.Klemmensen (Roskilde University), L.Ryden (Uppsala University), E.Tengstrom (Gotheborg University), L.Hens (Free University of Brussels), E.Tellegen (Amsterdam University), L.Emmelin (Lund University), R.S.Dorney (USA) and others. This literature analyses mostly the positive results of certain elements of content and forms of environmental studies, but not the development of pedagogical principles, approaches, etc. Likely, there is not found experience in the field of joint realisation of environmental science and environmental management studies as it is carried out in Latvia.

To fulfil the tasks the following methods of the educational research has been used - general theoretical methods like analyses of scientific literature and international experience and the empirical methods including observation (with and without participation); questionnaires (written questionnaires, interviews, discussions); development and analysis of pedagogical case studies; comparative analysis of university syllabuses; analysis of documents, including the analysis of MSc papers as well as pedagogical experiment.

Besides the Master degree programme development of continuing education programmes for the academic staff of the University of Latvia and other universities, school teachers, staff of environmental and local authorities took place within the international TEMPUS programme and in co-operation with specialists from Roskilde University, Free University of Berlin, Lund University and Storstroem County (Denmark).

Notwithstanding certain success in implementing environmental education in Latvia based on cross-curricular and interdisciplinary approaches there is necessity to recognise and cope with the following major problems in order to reach development of environmental education and training, and process of environmental awareness in Latvia:

* lack of National strategy on Environmental Education and Public Awareness (EE&PA) and joint concepts for environmental education in comprehensive and vocational and technical schools,

* lack of specialists and subsequently environmental education research - both for secondary and especially tertiary education - resulting in lack of pedagogical framework,

* insufficient possibilities of interdisciplinary and interactive pre- and especially in-service training for environmental specialists - managers, teachers, scientists, etc.,

* lack of the whole spectrum of basic resources - curricula, programmes, textbooks, teaching aids, etc., including approved environmental terminology in Latvian that delays integration of environmental education into all school subjects and universities curricula,

* bridging the gap of insufficient co-operation between the academics/ scientists and the non-governmental organisations, state environmental officials and legal and physical persons, nature conservationists and local population engaged and/ or interested in environmental education.

The comparative analysis of national and international developments of environmental education recognises the similarities as well as the certain differences, also those characteristic of a country-in-transition, including the dominant role of non-governmental organisations, great deal of using the experience of the cultural environment and national traditions, and finally successful everyday practice in concrete sites of Latvia as an outcome of advanced systemic and comprehensive approaches applied.

The analysis of the Western and Eastern Europe experience, in total more than 200 university environmental programmes, has been done. Considering the great variety in the field no systemic interdisciplinary programme, similar to the one designed during this research programme, has been found, mainly because most of the studied programmes have been developed on the basis of specific traditions and the real possibilities of each particular university department or faculty. Since the majority of these programmes are developed at the natural science or technical faculties, the humanities are most often whether not represented at all or only in the form of separate environmental philosophy/ ethics courses, but social sciences are quite regularly represented, however only partly (basically - environmental legislation and economics). Accordingly, also the study forms are often not diverse or problem- or project-oriented and interactive, excluding the universities with rich experience of group work. During the study the reconsidered definitions of environmental science and environmental management are also elaborated.

Summarising the detailed analysis of the several existing environmental studies programmes and many courses in Latvia, especially those intending to train environmental scientists and managers, it should be concluded that there is a tendency to develop multidisciplinary environmental science programmes with elements of environmental management subordinating them to the disciplinary interests of each faculty without developing into interdisciplines and very rarely using interactive study forms and approaches. Such applications are sufficiently leading towards interdisciplinarisation of environmental monodisciplines which is the first step in training of generalists in environmental management, however missing the second one - the development of multidisciplinary student groups with different backgrounds - either natural, technical, agricultural and medical sciences or social sciences and humanities as certain prerequisite for acquiring knowledge and skills and developing attitudes in the whole spectrum of interdisciplinary environmental science and management studies, including training for carrying out the group project environmental problem-solving work. The inter-faculty organised and interdisciplinary oriented academic environmental institution and organisation of environmental management studies at Master degree level offers a real possibility to implement this.

### *3. Approaches for Curricula Design*

There are four dimensions for curricula planning - tasks, contents, methods or process, and evaluation - which can be developed with each dimension separately or as a constant interaction among all four components. A.Kelly (Kelly A.V., 1988)[1] proposes the so called "development model" thus as the central component having the development because the main objective of the studies is not only acquiring knowledge or change in student's behaviour, but especially fostering the development process of certain intellectual and also practical qualities.

Our conclusions at the parallel analytical process, considering the necessary requirements for training of environmental managers with broad perspective and taking into account the existing possibilities for pedagogical innovation in the universities, have led to the elaboration of the "systemic process model" for environmental science and management Master degree studies. Accordingly, the interaction of interdisciplinarity and interactivity as the basic components of the process model was designed in the unity of the content and forms thus stressing the interdisciplinarity in both the content and the forms as well as interactivity as a paradigmatic study method including such methods and tools as group and project work, case studies, experiential and participatory learning, simulation and gaming, modelling, etc. The detailed analysis of the main skills as well as knowledge and attitudes that are formed by using different case studies and other methods in the programme, especially the use of simulation and gaming, and modelling methods in the environmental science and management studies process have been described.

It is significant to mention here the acceptance of the concept of interdisciplinarity which prevails in the literature on environmental studies (De Groot W.T., 1992)[2] : interdisciplinarity is more than one discipline dealing with empirical or normative science problem at a level of case study or wider theoretical level, reaching the result that is considerably bigger than the sum of the disciplinary contributions. Taking into account the above mentioned as well as practical experience gained and post-graduate courses tested, the paradigm of studies as well as several paradigmatic approaches are offered for environmental science and management studies. Accordingly, the conceptual scheme of the paradigm and its components for projecting, planning and implementation of the study programme have been developed: environmental management functions to be acquired during the academic studies for further professional life activities; paradigmatic method in order to fully implement the study process; the unity of didactic principles and didactic methods.

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[1] Blenkin G.M. and Kelly A.V. (1988) Education as Development in Early Childhood Education: A Developmental Curriculum, P.Chapman, London

[2] De Groot W.T. (1992) - Environmental Science Theory, Concepts and Methods in a One-World problem-Oriented Paradigm. Studies in Environmental Science. Elsevier. Amsterdam-London-New York-Tokyo, 583 pages

Analysing the professional activities of environmental managers and studying the general frame of problem-solving methodology, including the case studies and project management of the proposed solutions, there were developed four main environmental management functions of the interaction between nature, social environment and human life-long activities - evaluative, projecting, planning and implementation. Training for mastering and applying them into management practice of real environmental problem situations becomes the objective of the environmental management study process.

The acquiring of the above mentioned functions and their application in environmental management practice is really possible only if the whole study process is interactively organised and student-centred, using all possible means. In order to realise it as effectively as possible, it is necessary to have in studies united groups of students and also academic staff with multidisciplinar professional backgrounds, including social sciences and humanities, and their mutual accordance in the interactive environment of the study process.

### *4. The Course of the Educational Experiment and Results*

The objective of the educational experiment was to test the elaborated concept and subsequently the content and forms of the curricula of environmental science and management studies and to develop an optimal model for training of Master degree students. The objective of the educational experiment was carried out in two stages:

- developing and testing the multidisciplinary programme with the elements of interdisciplinary studies;
- developing and testing the multidisciplinary programme with the prevailing interdisciplinary aspect,

as the next step of curriculum development to deepen and extend the content and improving the forms and methods of the studies.

During the educational experiment the following originally designed curriculum elements have been distinctively approved: the cycles of the problem-solving seminars particularly stressing subsequent environmental management functions in different modules; academic team project master thesis (dissertation) and complimentary courses for development of a range of organisational, communicative and social skills. Specially should be mentioned the original innovation of intensive introductory module "Interdisciplinarity and Interactivity".

It was recognised that a crucial stage of the programme implementation quality is the selection of the next master students and formation of a really multi-disciplinary group. It is not only possible, but also advisable to invite for the Master course not only students of natural sciences, technical sciences and agriculture but also students of social science and humanities. The motivation for choosing these studies and the previous experience in the field of nature conservation and/ or management appears as important prerequisites to apply for studies aimed at training for professional activity contributing to the system of environmental protection, local authorities, universities, etc. Educational experiment had completely acknowledged the approaches used and the concept designed for environmental science and management studies. In the research there has been worked out the optimal model of the MSc programme consisting of three block-schemes - conceptual, functional and content models.

Apart from the knowledge and skills mentioned above, the students and graduates themselves specially estimate the acquired management, presentation, reporting and designing skills as well as the language proficiency (English terminology) and computer proficiency skills.

There is an additional outcome - the conception of the development of new multi- and interdisciplinary professional and academic study programmes, so marking the next step in the development of environmental science and management as an interdiscipline in the universities. There has been considered the conception of development of programmes for continuing professional qualification studies. The graduates of MSc programme on environmental science and management, according to their previously received Bachelor degree or academic diploma speciality and to those multifunctional environmental management fields of professional life activities they are involved in, would be able to receive appropriate additional training and professional qualification in the interdisciplinary field of environment (e.g., environmental planning, pollution prevention and waste management, environmental communications, etc.). Also the approach of developing new programmes for interdisciplinary academic master degree studies has been worked out, e.g., the programme "Environmental Pedagogy" aimed for comprehensive and vocational school teachers of different subjects, developed according to similar principles and based on interdisciplinary environmental science.

### *5. Conclusions*

The results prove that environmental science and management should be developed as an interdiscipline, i.e., as an integrated system formed by a set of interrelated interdisciplinarised monodisciplinary and interdisciplinary subjects, including theories and methods as well as methods and techniques applied, which are combined in the one whole so achieving the result which is more like a sum of separate components and differs in quality and in quantity from the result of a multidisciplinary system.

Accordingly, the training of environmental managers as generalists would be appropriate to organise in multidisciplinary completed and interdisciplinary qualified structural units on the level of Master degree studies. The studies should contain the acquaintance with the functions of interrelations between nature and social environment and human life-long activities to be trained not only for analysis and finding the ways of solving environmental problems, but for planning and realisation of practical problem solutions as well. This is achieved gaining the appropriate knowledge and skills and forming the attitudes by implementing the development process oriented curricula in the unity of content and forms by interaction of interdisciplinarity and interactivity as well as by interrelatedly succeeded application of "about environment", "in environment" and "for environment" curricular approaches, all that subsequently requiring work in project team and using environmental and project management knowledge and skills.

Training should be organised as interactive student-centred study process widely including simulation and team work. In the same approach, as proved by the experiment, maximum as possible to be used such forms as "group discussions", "learning by doing" and "learning by teaching".

Environmental problem studies should be considered as imperative of the whole Master degree study process regardless of the content and forms of each module. Creative environmental problem solving realised by experiential and participatory studies facilitates the development of general and environmental skills, attitudes and knowledge.

The research clearly proves the necessity of such innovative case study forms as intensive introductory module "Environmental Science and Management: Interdisciplinarity and Interactivity" for successful introduction to the programme as well as Master thesis work as an academic team project forming the "backbone" of the whole study programme and the basis for evaluation of the outcome, the realised academic analysis and problem-solving project preparation based on actual environmental problem situation and group presentation for public defence. The essential integrative component of the programme is regular multi- and interdisciplinary problem-seminars supplemented by examples in the form of environmental case studies in all other tutorials as well, including, the use of problem solving in the individual and group examinations evaluating students knowledge.

Interdisciplinarity and interactivity should be realised from every aspect already since the very beginning of the study process further providing their development in constant interrelatedness, simultaneously developing the action content and forms in their unity during the study cognition process according to the designed optimal model of the programme. Thus knowledge, skills and attitudes are formed in this unity.

# Interactive displays and the environmental message

Dorothy Evans
Interpretation Project Manager
Port Arthur Historic Site, Tasmania

## SUMMARY

Getting the environmental message across effectively is an essential component of many projects. Putting up a display is one technique which can be very effective but only if it is well thought through. Principles used in the advertising industry can be adapted as guidelines for environmental displays. Experience with Visitor Centre displays worldwide has shown that interactive displays have proved successful in capturing the attention and involving people who might not otherwise have been reached. Instead of the passive reading of text and looking at photographs, these displays require the visitor to take an active role, often using touch, hearing and smell. They can be readily adapted for use in schools and for public displays in many venues.

## INTRODUCTION

Anyone working in the field of environmental education is likely to be involved in communicating ideas to others. An educator addressing a captive audience in a classroom or lecture theatre has a good chance of gaining the attention of the group and, in theory at least, has an audience that is motivated to learn. But what of the community educator who has first to attract the attention of the audience and then hold it while trying to get the message across?

While it may be possible to talk to community groups, it is often difficult to reach large numbers of people. Written material can be extremely effective, but getting into the hands of the unconverted is often difficult. Audio-visuals, especially on television, can reach huge audiences but they are expensive to produce and have a short life.

Displays are not the answer to every environmentalist's prayer but if carefully thought through and carefully placed, can be very useful tools for reaching large numbers of people who might not otherwise receive your message.

### 1. Thinking through a display

Those of us working in various park systems and in historic sites have been grappling with the problem of reaching an audience who are out to enjoy themselves. They are not looking for a heavy learning experience yet are usually willing to look at a display or read a small amount. A personal chat to each one would be ideal but that is an expensive luxury that few managements can afford. Most people on holiday are unwilling to devote much time to reading long slabs of text, generally have a short attention span, are easily distracted and tend to drift unless clearly directed. In fact, not at all unlike many students.

The guidelines that have evolved for public displays in visitor centres are relevant to displays in school libraries, shopping centres, hotel foyers or anywhere else where the environmental message needs to reach a passing audience.

There are five decisions to consider before starting. I learned them years ago in an advertising seminar. They are widely used in promotions and advertisements and can be remembered by those of us with failing memories as the 3 M's and 3 A's

### Audience

Who are you aiming at and who is likely to see the display? Is the intended audience a school group, a group of shoppers, travelers passing through a hotel foyer, people passing by a shop window? How good are their reading skills and how long do they have to read any text? How robust must the display be for this audience? Is a high tech computer game right for an old folks home? How much previous knowledge, skill or experience can you expect from this group?

### Attention

Will people stop to look at your efforts? Somehow you must grab their attention. Use bright colours or huge dimensions; ask a question; provide a challenge; invite an action; say or do something outrageous; display an object right out of context. Look at advertising billboards for brilliant use of these techniques. Once you have the audience's attention you can start to deliver your message.

### Message

What are you trying to say? It is important to be clear in your own mind. What is the single sentence that encapsulates the essence of the message? It's not so easy to sum up concisely and you would probably not use these actual words for the public but they serve to keep the objective clearly in the minds of you and the team putting together the mechanics of the display.

### Medium

How will you impart this message? Someone could staff the display full time but the cost is likely to rule this out except perhaps for short term displays at shows and expos. Brochures and handouts are good to encourage people to take away and read later, although many are never looked at again. Audio-visuals, a computer screen or a video can be useful, especially if you do not have the initial cost of making them. Text and photos are the standby of many displays and still have their place, but they do not involve the viewer actively. Interactive displays that require some deliberate action and conscious thought have proved very successful. These will be discussed more fully in part 2 of this paper. The final choice of media will depend upon the budget, the amount of labour available, how long your project should last, the audience, the venue and facilities available and no doubt your own skills and preferences.

### Motivation

Why should people take any notice of your message? Is it going to make them any richer, sexier? Avarice and lust are supposed to be the greatest motivators. Is it going to give them any other edge over their fellows? Will they do better in exams, gain promotion, appear more skillful or knowledgeable in the eyes of their peers? Maybe you can appeal to their consciences by removing fear or guilt. Or play safe and make them feel warmer, safer, happier or more loved as a result of receiving your message.

**Action**

What do you want people to do as a result of your message? This is questioning the whole purpose of your efforts. You might be aiming at eliminating an action that is considered undesirable or trying to promote behaviour that should be encouraged. Perhaps you are aiming to change their perception of something, or simply trying to increase their knowledge and appreciation of the environment with a view to changing their set of values.

## 2. Interactive displays

> Interactive displays involve the visitor in doing something. It may be a physical action like lifting a flap or a mental action like answering a question. A reward is built in so that the visitor gains something extra that would otherwise have been missed

The old adage that is so often quoted is particularly relevant.

I hear and I forget
I see and I remember
I do and I understand

## 3. What are the advantages of interactive displays?

- The visitor is involved and active instead of passing by with glazed eyes and in a passive state.
- Usually an element of surprise, suspense, excitement, humour, intrigue, stimulation or the unexpected is involved. This makes for greater visitor satisfaction and a more memorable experience.
- More than one sense is involved, usually sight with hearing, touch, smell or occasionally taste.
- This type of display satisfies adults' urge to touch, and children's need to be involved with concrete examples or actual experiences.
- Text is de-emphasised, thus avoiding difficulties with those who cannot read or do not

understand English.

- A variety of interpretive techniques can be introduced into a display, keeping the attention of visitors for a longer period.

## 4. What are the disadvantages of interactive displays?

- Maintenance can be time consuming for long term displays. Moving parts wear out, bulbs blow, motors stop working, bits break off or are stolen, computers stop working and so on. A comprehensive set of spare parts needs to be on hand and a program of maintenance carried out regularly by people who understand the displays
- Capital costs can be high. Many techniques are cheap and simple, but the electronic displays and complex games can be expensive to set up, unless done 'in house'.
- A single interactive display can be too popular. If visitors spend all their time at one point the messages from the static displays will be bypassed or forgotten.
- They can be a source of annoyance to staff and visitors. Sudden noise, flashing lights, dropping flaps, electronic beeps, clashing soundtracks, even laughing and shouting can be distracting and intrusive to those looking for a more tranquil experience.

## 5. What sort of interactive displays are there?

### 5.1 Real or substitute objects

Expendable objects

- Touch tables, nature tables and mystery boxes that allow the entry of an exploring hand have been around for a long time. They are a cheap and easily maintained way of drawing attention to the treasures that are to be found elsewhere.
- Pieces of rocks, wood, machinery and other relatively indestructible objects can be left for visitors to pick up. If they are destroyed or stolen their replacement is not difficult.
- Facsimiles, models or casts of fossils, coins, animals or other valuable objects can act as a substitute for the real thing. Their loss may incur a cost, but will not be a disaster.

Immovable objects

- Fixed to a bench. A wire attached to the object, threaded through a hole in the bench and counterweighted allows objects to be picked up for examination but not taken away.
- Stuck down. Screws, glues and rods are effective in stopping theft. If they are concealed and appear as part of the display it is more aesthetically pleasing. Objects can appear to be half buried in mud or sand, impregnated with resin and set on a base, modeled eggs and chicks firmly bolted to the nest or the base of an object screwed to the floor.

### 5.2. Lift or slide a flap

This principle has been used to great effect for many years. It is cheap, simple and can be used to reveal an amazing variety of things. There are three elements: the lid, which may be a simple piece of wood or can be fashioned to look like a rock, slab of mud or part of the display: the handle, which can be a knob, part of a machine, a tool or any other artifact connected with the display; and the hidden part, which may be an object, a piece of text, a mirror, a sound track, a smell or a video loop. The combinations are endless but usually fall into one of the following categories.

Question (on the lid) and answer (the hidden part)

- Lift up an object (the lid) to reveal what lives or goes on below
- Lift or slide the lid to sniff the contents
- Remove the skin (the lid)to look into the anatomy or the inside of something
- Lift a telephone or an earpiece to hear a commentary

### 5.3. Push a button

In its simplest form this type of interactive simply requires the visitor to push a button which completes an electrical circuit. The result might be that a light comes on, a sound track plays, a video loop operates or a mechanism begins.

Instead of putting a finger on a button or pressing a switch there are more subtle ways of achieving the same result. A light beam broken by people walking towards a display can activate sound or light. A pressure pad on the floor, sometimes under a mat or even under a slab of turf, has mystified many visitors who cannot see what started the voice addressing them.

The most common uses of buttons are to

- Light up an object, often in a tree hole in a cave or a burrow
- Backlight a photograph or highlight a model, to show something normally concealed
- Start up a sound track, possibly weather sounds, animal noises, or a commentary
- Start up a movie, usually as visitors enter a cave, house or other small space for viewing
- Start up a mechanism or engine, to show a process or an activity

### 5.4. Look through a magnifying apparatus

There are many processes and objects that cannot be readily seen with the naked eye. They may be too small, too distant, too difficult to distinguish or be concealed from view. Aids to viewing range from the simplest lens through to complex electronic technology.

Visual aids include the use of

- A lens, either hand held or fixed. for greater detail of fairly large objects
- A microscope, to reveal what the naked eye cannot see
- A mounted telescope or binoculars, to see distant objects more clearly
- A TV or computer screen, to show what visitors are unlikely to see for themselves

### 5.5. Build up a picture

Environmental educators are often faced with trying to explain the concept of change. This usually involves explaining what the original state was and how alterations have taken place over time. The time may be a diurnal change, an annual change, historical time or geological time.

Techniques which may be used involve
- Adding transparent layers, each subsequent one showing a partial change
- Removing solid overlays, possibly parts of a jigsaw revealing a different scenario below
- Choosing future scenarios, usually as part of an interactive computer game

### 5.6. Complete a puzzle or game

Children seem to enjoy this sort of challenge. If they are the target audience, the puzzle components should be large, brightly coloured and robust. Many children's games can be used for ideas and adapted for use in museums or visitor centres.

Some successful ideas that have been used include
- Jigsaw puzzles, where the completed picture gives the answer to a question, or where the actual fitting together of pieces shows the relationship of objects eg animals and homes, predators and prey, tools and uses, analogies etc.
- Matching pieces, sections or pairs. Like jigsaw puzzles these show relationships or consequences.
- Manoeuvring a playing piece from one place to another. This might be a dice game with a piece encountering hazards on the way to a goal or a game requiring manual dexterity.
- Pinball games, where a ball-bearing shot along a track by the player, represents the travels of a character overcoming dangers to reach a goal.

### 5.7. Act like an animal

Most children enjoy both role playing and the chance to climb or crawl on displays. To invite players behave like an animal or a character from the past, is usually irresistible and should be designed to give an insight into the problems and strategies employed to cope with them.

Opportunities can be provided to
- Crawl through a burrow, into a hole, into a hollow tree. Texture and light levels should be considered as well as the opportunity to put graphics or embedded objects inside.
- Climb up steps or a ladder and look above the surface. A burrowing animal has enemies above ground which await an incautious head.
- Scratch in the leaf litter to find food, try to spot well camouflaged prey or attempt to pick up slippery or small objects.
- Use tools to simulate animal parts. Birds' beaks can be represented by tweezers, pliers, sieves, nets or any other tool which requires dexterity to use.

### 5.8. Experience the 'real' thing

Sometimes it is impossible to experience an actual event. It may have happened in the past, be far too dangerous, be too far away or even exist only in the imagination. However children and adults enjoy the thrill of going on a ride, driving a vehicle or using machinery that they would never have seen before. The experience does not have to be totally authentic, in fact it is often more fun if it is frankly make believe. A visitor could:

- Ride on a train, carriage, boat or plane, either a real one or a model, with simulated motion
- Walk or be conveyed through an imaginary or historical reconstruction, with smells as well as sounds.
- Experience a natural phenomenon through simulated motion. An earthquake platform or a darkened room with shrieking winds for a cyclone.
- Drive a conveyance using video or computer screen as a windscreen, include the steering wheel, gearstick and foot pedals if possible
- Use old tools or machinery, to tap out a Morse code message, to connect a switchboard, to prepare food, farm or perform a task from the past
- Put on goggles to reveal a scene. Small video screens can be built in to reveal film of underwater, outer space or fantasy lands
- Put on ear phones to hear a sound track. Role-playing is enhanced if the surrounding sound effects are authentic

### 5.9. Interactive computers

Computers are being used more and more. Most computers available for public access use touch-screens, in preference to a keyboard. Some computers are little more than electronic page turners where one page of information is followed by another. Others present a multiple choice screen to allow the visitor to select specific information. Huge quantities of data in the form of text, soundtracks, photographs and video clips can be stored, either on disc or on CD's. Some of the most interesting work at present is being done to develop interactive computer games with a message.

Computers in displays can be used:

- To access detailed information via multiple choice screens
- To select a particular action from a selection shown. This might be to play a video, send a message, print a leaflet or listen to a sound track
- To show the consequences of a particular course of action. Usually by taking the role of a character and making decisions for him or her
- To play 'computer games' which require manual dexterity, the ability to negotiate hazards, knowledge of potential danger, planning for future needs or performing some action that imitates life.

## 6. Protecting real objects that should not be touched

There are times when you are presented with a situation where visitors cannot be allowed to handle or approach an object. Some way has to found to guarantee the well-being of the object and yet satisfy the visitor. There are many ways of keeping things out of reach, the final choice depends upon the value and vulnerability of the object, the danger to the visitor, the size and weight of the object and on the degree of security of the display area.

### Large or dangerous objects

- Behind a physical barrier. This might be a wall, a fence, a moat or ditch. A roped off sculpture or a raised platform is adequate in a venue with staff nearby.
- Behind an invisible beam. When the beam is broken, an alarm sounds or staff are alerted.
- The original out of reach but a piece specially presented for touching. This could include a sample showing the technique used to produce an artwork; a prepared skin or shell from a species on view or a facsimile fossil bone.

### Medium sized objects

- . Out of reach. They may be suspended from the ceiling, placed out of reach, positioned inside a hole or perched in a tree.
- Behind glass or perspex. A glass cabinet, picture frame, aquarium, terrarium, outside a window, under a glass tile in the floor all utilise the same transparent barrier.
- Under water. Cold water can be an effective deterrent. It may be too deep to reach into or it might allow an animal to swim away.
- Under coloured light. This is a psychological barrier but people have been shown to withdraw an outreached hand when it suddenly turns colour.

### Small objects

- Embedded in resin. Very fragile or easily pocketed objects like small skulls, some insects, shells, artefacts and coins are both protected and made larger inside a resin block.
- In a plastic folder or between perspex sheets. Documents, photographs, fabrics or any flat object can be presented in a 'book', either horizontally on a bench or vertically as a wall mount.
- In a clear plastic viewing box. The box can be picked up and examined but the contents are protected.

## 7. In conclusion

The art of the Environmental Educator is to involve people, help them to learn and to provoke them to thought. Interactive displays require the viewer

- to perform a task themselves giving maximum involvement.
- to perform an action which means that the visitor understands more clearly and therefore learns more effectively.
- to think for themselves. The thinking process is the most difficult to stimulate, but an enjoyable experience is one that is more likely to be repeated and one which will remain in the memory for later reflection and recall.

Finally, the evaluation. Ideally you will decide on a formal evaluation to assess the success or otherwise of the display. However if this is not possible at least put by a little time to mingle anonymously with the visitors, watch their expressions, listen to their comments, see how long they spend at each part of the display and see whether the actions you intended did take place.

Hopefully you will find the whole thing a great success, if not it will all be good experience for next time.

# Into the Dragon's Lair,
# a community-based, marine monitoring project.

Tony Flaherty
Marine & Coastal Community Network (SA)
PO Box 120 Henley Beach, SA 5022

Vicki Jo Russell
National Threatened Species Network, (SA)
120 Wakefield Street, Adelaide, 5001

## SUMMARY

Seadragons are spectacular small fish with a delicate seaweed-like appearance. Related to seahorses, the two species are found only Southern Australian waters.

Many divers record their sightings of seadragons in their dive logs. This provided an opportunity to encourage divers to become marine naturalists. *Dragon Search* encourages divers to submit records of sightings, with habitat and other information. Non-divers have been involved in the project by recording beach-washed records of the species. This information is entered on a database for use by marine ecologists to gain a broader knowledge of distribution, status and life history of these fish.

The *Dragon Search* seadragon monitoring program aims to encourage the involvement of divers in marine conservation issues and heighten public awareness for marine habitat protection. Divers can be pioneering scientists, since virtually nothing is known about many marine creatures.

The *Dragon Search* project appears to be successful in creating awareness of potential impacts to seahorses, pipefish and seadragons and more importantly, the marine environment. The data is helping to define important habitat areas for Seadragons and may assist in the establishment of marine protected areas in significant habitat areas. What the project is showing is that seadragons and seahorses are an extremely popular species that captivate the public imagination. Seadragons can be a "flagship species" for marine conservation in southern waters. As such they can serve as a rallying point for major conservation initiatives.

## INTRODUCTION

### Seadragons

Seadragons are a spectacular small fish found only in Australian waters. Along with seahorses and pipefish these fish belong to the family Syngnathidae which includes over 200 species world-wide. Syngnathids are long, slender fish with bony plates surrounding their bodies. The Latin name "syngnathid" refers to the jaws of these fish which are united into a "tube-snouted" mouth. Many people are familiar with seahorses, however seadragons can be distinguished by their long bodies and many leaf-like appendages on their head and body. Pipefishes have a long thin snake-like bodies with a head in line with the rest of their body.

Two species of seadragons occur in southern Australia, the "common" or Weedy Seadragon, *Phyllopteryx taeniolatus* (figure 1) and the Leafy Seadragon, *Phycodurus eques* (figure 2). Both species resemble floating pieces of seaweed which can make them difficult to find in their natural habitat.

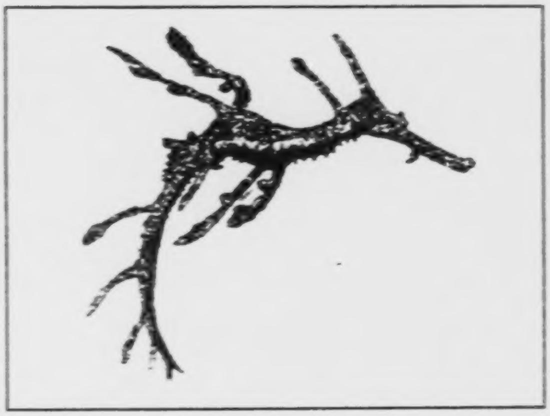

Figure 1. A Weedy Seadragon. Weedy Seadragons are endemic to (ie. they are found only in) southern Australian waters. Adult 'Weedies' grow to about 46 centimetres in length.

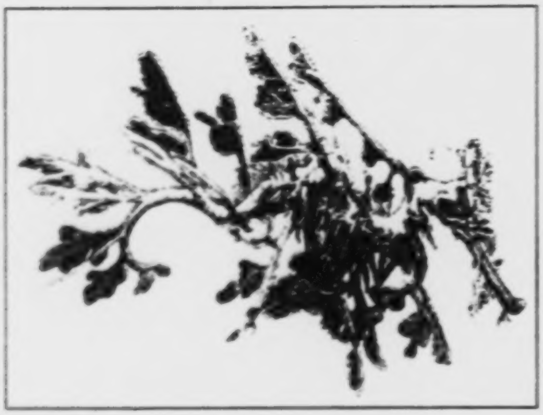

Figure 2. The Leafy Seadragon is endemic to South Australia and parts of Western Australia. Adult 'Leafies' grow to about 30 centimetres. The 'leaves' on the Leafy Seadragon are more numerous and branching than on 'Weedies' and look distinctly like blades of brown seaweed. 'Leafies' have several long sharp spines along the sides of the body. Divers have observed seadragons 'curling up', presenting these spines to attacking fish.

Seadragons are 'protected' under most state's fisheries legislation. There is, however, virtually no information on population size, status and the legal and illegal take. This makes sensible management of these fish virtually impossible. The pressure for international trade in seahorses, pipefish for the aquarium and Asian "medicine" trade is expanding (Vincent 1996).

**Why Survey Seadragons?**

It is only recently that the threats to marine biodiversity have been recognised. These threats relate indirectly or directly to development of coastal areas and pollution or exploitation by humans. There are numerous examples of marine mammals and birds that have become extinct or are vulnerable but little is known about the vast majority of marine invertebrates and fish (Jones and Kaly 1995), or their status.

Many people think of fish in the ocean as an inexhaustible resource. Most of the research on fish in Australia is on commercial species and little is known of the lives of even the most common non-commercial species. Divers who know their local areas and favourite dive spots can often see changes but are often a quiet minority. By making divers familiar with recording observations, the seadragon monitoring program aims to encourage divers to be pioneering researchers, since virtually nothing is known about many marine creatures, in the wild or captivity.

Most people are familiar with the "charismatic marine mega-vertebrates", marine mammals such as whales, dolphins or sea lions. In South Australia marine protected areas for vulnerable species relate to sea lions and more recently proposals of habitat protection for Southern Right Whales. There are however a number of fish and invertebrate species and their habitats that may be vulnerable, but there is little information available to assess their status or define areas for habitat protection.

There are usually limited resources for fisheries managers to investigate the conservation and management of fish that are not directly targeted by 'traditional' recreational or commercial fishing. With this in mind the Marine and Coastal Community Network, the Threatened Species Network and the Marine Life Society of South Australia undertook to develop a data base of leafy and weedy seadragon sightings. Seadragons are potentially a "flagship species" for marine conservation in southern waters. They are popular species that can serve as a rallying point for major conservation initiatives (Noss, 1990).

Fish such as the seadragon highlight the high degree of uniqueness or endemism of species that exists in southern temperate waters. For example, as well as the many unique fish and invertebrates, there are twice as many species of seaweeds alone in southern waters than on the Great Barrier Reef and off Ningaloo Reef in WA. Australians are not generally aware of the immense marine biodiversity they have off their southern coast and the spectacular and unique environments that exist there.

Water-watch, Frogwatch and Environmental Protection Authority programs use frogs as a "charismatic" and useful indicator of freshwater water quality monitoring. The Leafy Seadragon is a colourful marine fish that could be adopted in a similar "mascot" capacity for marine water quality awareness. It has been suggested that seadragons may be sensitive to changes in water quality. Long-term monitoring of seadragon populations could also be useful as indicators of changes in water quality, especially in relation to catchment events.

There is widespread interest in developing community processes for the monitoring of salt-water environments, including mangroves, estuaries and sea grass. The Marine and Coastal Community Network hopes to encourage a adoption of similar community initiatives. Awareness generated by the *Dragon Search* project has been beneficial in generating interest in other marine monitoring projects such as Reefwatch, a community reef monitoring program being developed by the Conservation Council of South Australia with assistance from the Environmental Protection Authority, the Marine and Coastal Community Network, the Threatened Species Network, the University of Adelaide and scuba divers.

## Making a Difference

A basic principle of the project is the assumption that learning about the marine environment and sharing your knowledge and enthusiasm is the one of the best ways to help make a difference. Seadragons are animals which stir up emotion and have encouraged a lot of curiosity in divers, beachcombers, teachers and students. By reducing marine pollution and conserving the marine environment for species such as seadragons we can also ensure a healthy environment for all our marine life.

### *Dragon Search*

Marine conservation initiatives in England and the United States have been greatly enhanced by promoting awareness and interest amongst the diving fraternity (Bill Foster pers. comment, 1995). *Dragon Search* follows in this tradition.

Many divers already record their sightings of seadragons in their dive logs, and the opportunity exists to tap into these records to collect baseline data. The diving and snorkelling community are encouraged to submit records of sightings, with habitat information to gain baseline information. Such data is helping to define important habitat areas for seadragons and will be used to assist in the establishment of marine protected areas in significant habitat areas.

Non-divers are involved in the project by recording beach-washed records of the species. This may also give an indication of major mortality periods for the species. Historical and field naturalist's records are also encouraged and recorded.

Increased awareness and involvement of local communities may help prevent poaching of Seadragons and encourage protection of both the species and its habitat. Responses to the project have already reflected this, with people from around the country contacting the project coordinators to express concern over potential threats. The ultimate aim of the project is to provide information to identify sites suitable for Marine Protected Areas for the species and habitat and to create an atmosphere of responsibility and ownership in the community towards these areas.

There is also potential for local "eco-tourism" industry to develop based on snorkel tours to view Sea-dragons. This could act as an additional eco-tourism focus in whale watching activities in communities such as Victor Harbor. There has been local interest in such a proposal, however information on the occurrence and abundance of the species at these areas is necessary to determine the feasibility and seasonality of such an industry and also the possible impacts that could be associated with it. The *Dragon Search* monitoring program aims to assist in determining such guidelines, and provide data needed in the development of a "Diving with Dragons" program, as well as promoting stewardship of local populations of these fish to prevent poaching and other impacts.

**The Project aims to:**

- increase awareness of syngnathid species and their value;
- establish a database of information to help answer some important management questions regarding the species;
- increase community awareness about the marine environment and some of the threats affecting it;
- increase awareness of no-commercial Australian fish species and their value;
- involve the community so a sense of ownership and custodianship develops - it is also very cost effective;
- identify the status of these species;
- increase the community's sense of pride and ownership over this unique and spectacular Australian wildlife;
- highlight the uniqueness of species biodiversity in the southern temperate waters of Australia.

**Principal Aims and How They Are Being Achieved?**

**Aim 1 :** To encourage community involvement in the monitoring of marine fish species and their habitat.

**Action 1:** An information pamphlet has been produced which outlines the project, examines the importance of marine conservation, identification features of the two species of sea dragon and includes a survey form. The Marine & Coastal Community Network is used as the clearing house for information and reporting of sightings.

**Aim 2:** To promote public awareness on marine conservation and need for habitat protection and impacts on marine habitat..

**Action 2:** With the successful bid for a Coastcare grant in the project's first year, a part-time project officer was engaged to target key community groups and to coordinate dive group surveys and provide feedback to groups on the information and coordinate volunteers. The project officer also organises media and publicity and liaises with community groups to highlight aspects of marine conservation and awareness.

**Aim 3:** To establish a data base of Seadragon sightings that can be accessed by researchers and used as an aid to define key habitat areas for the species.

**Action 3:** To increase and maintain on-going management of the data base, the SARDI Aquatic Science Centre was approached to become a key partner in the project. With assistance from their marine ecology section, a data base was designed and methodology for data collection and details standardised.

The survey data and recommendations on significant habitats for seadragons will be available in report form to relevant management, research and conservation organisations to assist in the conservation and management of the species and their significant habitats.

**Aim 4:** Establish a pilot program of community-based underwater monitoring that could be applied to other non-commercial fish species.

**Action 4:** The project has already generated interest in monitoring other species and habitats. The seadragon monitoring program is seen as a pilot project for the feasibility of a state based fish survey. Methodologies for this are currently being developed by the Marine and Coastal Community Network, based on similar fish count surveys overseas. Community based monitoring of fish species could provide useful indication of changes and possible impacts to marine environments, as well as promoting community involvement and awareness in marine conservation. In addition, the Conservation Council of South Australia has received Coastcare funding to develop a 'Reefwatch', community reef monitoring project. The experience of the *Dragon Search* project has been invaluable in developing this other program.

Response to the survey form and feedback on sightings has been a key performance indicator of the project. At time of writing, over 250 sightings had been received from SA, Victoria, NSW, Tasmania and Western Australia. General community response and feedback to the survey proponents from media publicity has also been good.

## The Data Base

Information from the survey sheets is entered on an ACCESS Data base format. Fields of information cover location, numbers of animals, search time, depths and habitats, threats, behaviour and breeding status. The South Australian Research and Development Institute Aquatic Science Centre has provided invaluable support and assistance in the design of the data base. The information is available to Dr. Rod Connolly and Jeffrey Kwik and also the SARDI marine ecology unit working on marine biodiversity mapping.

The *Dragon Search* data base is community generated information, and as such should be available to the community in some form. However, in the initial stage concerns were expressed by the diving community, not to provide information on specific locations which may be used for legal and illegal collection of these fish. Reports generated for general use will incorporate information at a regional level rather than site specific information.

Data is still being gathered. In the first six months of the project over 250 sightings were submitted and 250 people "enrolled' in the *Dragon Search* project. Analysis of the data will be undertaken in the second year of the project when an extensive data set is obtained.

Whilst the *Dragon Search* data base is still in its early stage, initial records obtained appear to reflect some of the anecdotal comments made by divers. Of the records entered in the data base over seventy per cent are of sightings of Leafy Seadragons. It may well be that Weedy Seadragons are "uncommon" in South Australian waters and may well warrant protected fish status similar to 'Leafies'.

Of note is the lack of recent sightings of 'Leafies' from areas of the Fleurieu Peninsula. A number of areas here were known as "hot spots" amongst divers (and aquarium collectors). The fewer sightings received from these areas so far tends to support the recent call for a moratorium on collection of both Weedy and Leafy Seadragons in areas around Victor Harbor and the Fleurieu.

## Project Officer

*Dragon Search* was successful in receiving a Coastcare grant which enabled a part time project officer to be appointed for the first year. This has been instrumental in coordinating and raising the project's profile. The position entails promoting the program and liaising with community groups, also assist with data base design and maintenance. The project officer is also available to talk to school and community groups on the Seadragon project and other aspects of marine conservation.

As the project is "community-based" and driven the primary accountability of the project is to the community members involved. The project officer is responsible for regular updates to participants through the media and the projects information sheet "The Dragon's Lair" and the newsletters of the Marine and Coastal Community Network, Marine Life Society, the Threatened Species Network and dive clubs.

The appointment of a project officer and the linkages to the two Networks, has been a key factor in maintaining the project's impetus.

## What it's All About: Working With Others

*Dragon Search* has been successful in forging links between a wide range of educational, research conservation and community groups. Seadragons have turned out to be an extremely popular species that readily captivate the public imagination.

The *Dragon Search* project appears to be successful in creating awareness of potential impacts to seahorses, pipefish and seadragons and their environment. The data is helping to define important habitat areas for Seadragons and may assist in the establishment of marine protected areas in significant habitat areas. Seadragons can be a "flagship species" for marine conservation in southern waters. As such they can serve as a rallying point for major conservation initiatives.

## Outline of Principal Organisations Involved and Integration with other Research and Education Activities

### Marine and Coastal Community Network

The Network is a non-government, community based organisation which is funded through the Australian Government's decade long marine conservation program *Ocean Rescue 2000*. The MCCN aims to foster community involvement in marine conservation through facilitating information exchange and consultation. The host organisation for the Network in SA is the SARDI Aquatic Science Centre.

### Threatened Species Network

The TSN is a community based network which aims to increase the support for protection of Threatened species and their habitats throughout Australia. Nationally the TSN has been active in raising the awareness of the increasing pressures on syngnathid populations. The host organisation for the Network in SA is the Conservation Council of SA.

### Marine Life Society of SA

A special interest group concerned with study and awareness of marine flora, fauna and environments, underwater photography of marine life and maintenance of marine aquaria. The MLSSA is affiliated with the Scuba Divers Federation.

### The Australian Marine Conservation Society,

AMCS (formerly the Australian Littoral Society), is a non-profit, non-government organisation that promotes the study and conservation of marine and aquatic life. It is widely used as a source of expertise and information by government agencies, politicians, media and the general public, both in Australia and abroad.

### SARDI Aquatic Science Centre

The Marine Ecology section of the South Australian Research and Development Institute are assisting the project. Dr Karen Edyvane and Janine Baker have been developing databases for mapping and analysis of South Australia's marine biodiversity. Their expertise has been invaluable in developing the DragonSearch data base and will be invaluable for analysis of the data.

### Griffith University

Rod Connolly of Griffith University is working on a three year study to develop marking methods and local assessments of population and movement of Leafy Seadragons in South

Australian and Western Australian locations. His study is looking at developing techniques for population studies and tagging. The *Dragon Search* community-based study is complimentary to this research program, encourage widespread community awareness and assistance with data collection and definition of habitat areas for future studies.

**Flinders University**
Jeffrey Kwik, an Honours student is looking at the distribution, population dynamics and habitat preferences of leafy seadragons. His work is integral with that of Dr Connolly, SARDI and the *Dragon Search* project.

**The Gould League of SA**
The National Gould Leagues of Australia, a key environmental education resource group, are developing a *"Timelines"* project to produce calenders of natural history events throughout Australia. Marine details are also sought, and information from *Dragon Search* participants and other groups can be used as material for this project. The Seadragon is also being used as a flagship species for developing a marine education cross-curriculum package for Primary and lower secondary teachers.

**Marine Education Society of Australia, SA Branch**
MESA is concerned with the development of understanding, appreciation, wise use and protection of the marine environment, and the study and enjoyment of marine and estuarine areas. It aims to promote marine education through professional development of members, cooperation with affiliated educational and conservation and groups and public awareness campaigns such as SEAWEEK. State members are involved in the project.

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# Making Links:
# Small Business, The Environment & The Community

## The SOLUTIONS to POLLUTION
## Small Business and Industry
## Environmental Review & Education Program

**C. Ford and M. Maheshwari**
**Education & Community Programs Branch**
**NSW Environment Protection Authority**

### SUMMARY

Involving and encouraging people in small industries and businesses to take responsibility for the environmental aspects of their premises is a significant challenge for environmental educators. Many people in small industries have limited access to environmental information or training; have limited resources (people, time and dollars) to allocate to the development and implementation of environmental management programs; and are wary about government agencies assistance in this area. The SOLUTIONS to POLLUTION Small Business and Industry Environmental Review & Education Program (EREP) was developed in response to these needs and concerns. It follows a pilot project conducted by the NSW Environment Protection Authority (EPA) and Shoalhaven City Council in two industrial estates in Nowra. The NSW Government, through the EPA, has extended the program in 1996 to 12 local councils focussing on 11 priority small industry sectors.

### INTRODUCTION

Owners and operators in small businesses have been slow to respond to community expectations and concerns about environmental quality. A cooperative education approach may be the way to encourage small industry and business to meet community expectations while also improving their business performance. This approach was tried in 1995 in a pilot project between the NSW Environment Protection Authority (EPA) and Shoalhaven City Council. The following comments are from three business people who participated in the pilot "Environmental Review & Education Project" (EREP). They highlight the value of "working in partnership" with business and industry to achieve motivation, ownership of and commitment to improved environmental performance.

> *"To me the success of this project was best demonstrated through the fifty tradespeople who came to the Environmental Trade Night. In the motor trade these days, if you get ten to twelve people to a trade night, including reps, you are doing very well. Most people in the trade in the area had heard about the project and how it was all about* ***trying to help the trade solve some of their environmental problems****. That's why they came. It really was a great result."*
> ***- Allan Spencer, Everlast Engines, South Nowra***

*"The project was a great learning experience for me. I learnt about a whole lot of ways my business can have an effect on the environment. I didn't know about any of that stuff before.* ***The project also gave me lots of good reasons for making that extra effort to protect the environment.*** *The other important thing I learnt was how much easier it is to get things done when people work together."*
***- Don Woods, D & P Woods and Sons, Motor Vehicle Repairers South Nowra***

*"This project was excellent in the way it drew people together. It was excellent in the way it encouraged industry to play its part, and it will be even better when the opportunities it has exposed are taken up.*
***- John Lamont, Nowra Chemicals and Executive Member of the Shoalhaven Manufacturers' Association***

## EDUCATION - A PARTNERSHIP APPROACH FOR ENVIRONMENTAL ACTION

Education which aims to:

- enhance people's **knowledge, understanding & skills**
- influence people's **values & attitudes**
- encourage different **practices or behaviour**

is one of the essential tools in the "tool kit for environmental change".

Education provides a non-threatening approach for involving small businesses in environmental action. Good environmental education practice is characterised by:

| | |
|---|---|
| • **Communication** | providing opportunities for two-way dialogue which gathers and gives knowledge and understanding |
| • **Motivation** | stimulating interest by providing opportunities for examining beliefs and values |
| • **Support** | providing skills and resources which lead to empowerment and ownership |
| • **Collaboration** | involving stakeholders and learners in decisions about the planning, management, content, style and delivery of a project |
| • **Positives** | focusing on what can be done; the solutions to problems which can often be simple changes in behaviour |
| • **Action** | review, revision and new action. |

Education, which aims to protect and improve the environment, should involve everyone in our community: students in primary, secondary and tertiary systems; people in business & industry; and residents. In the 90s considerable effort has been directed towards improving the environmental performance of **large industries**, and many of these industries have also responded proactively to increasing community and Government expectations for improved environmental quality. Attention to the environmental impacts of **small industries** has been less extensive. The development and extension of the EREP is a recognition of this need.

## RATIONALE FOR THE EREP

### Why "small" businesses & industries?

Small businesses & industries have received relatively little attention in relation to the development and implementation of environment protection programs.

There are thousands of small businesses & industries in urban areas which can potentially have a significant cumulative environmental impact particularly in relation to water pollution and waste generation.

Many people in small industries have limited access to environmental information or training. Also they have limited resources (people, time and dollars) to allocate to the development and implementation of environmental management programs.

The environment is or is becoming a mainstream social issue. It is not just people in the "green" movement who care about the quality of the environment but a diverse cross section of the population (all ages, cultures, occupations, interests, politics). The small business and industry sector is recognising the mainstream community concern about environmental quality and is showing a willingness to do its part in meeting the community's expectations.

### Why an "Education" & "Involvement" Approach?

Education provides an approach which is non-threatening for many small business people and enables partnerships to be developed between key stakeholders to achieve benefits for all.

An education approach recognises that the solutions do not rest with government agencies or authorities but with people, in all aspects of their lives, including in businesses. An education approach enables a mutual respect and trust to be developed which over time can lead to effective change in business practices.

Adult education is a two-way process. It can provide useful learning to government agencies (local and State) about: the environmental education needs of small business people; the constraints and barriers which hinder better environmental practices within this community sector; and opportunities for ongoing partnership activities.

### Why "Local" Government?

Local problems are best addressed through local actions. Involvement of key stakeholders at the local level will encourage ownership of the problems and the solutions. Linking local actions through networks, such as industry associations, can lead to expansion and a global approach across an industry type.

The environmental roles of State and Local Government authorities in relation to local communities are still emerging and vary between jurisdictions. In NSW, a delineation in responsibility for commercial and industrial premises has occurred in relation to a broad classification system of "scheduled" or "non-scheduled" premises. Non-scheduled premises are the small and medium-sized industries or businesses that do not require pollution control licences issued by the EPA. Local government has responsibility for the environmental impacts of these premises.

Local government has increased regulatory powers under the Clean Waters Act and in the near future it is anticipated that local government will have further clarification of its role in environmental matters with the proposed Protection of the Environment (Operations) legislation.

In response to community demand many local councils are now taking a more active role in local environmental management and are allocating resources in line with local environmental needs. The EREP is a useful method of addressing these needs. It can provide important information about the current state of the local environment and can identify environmental concerns to be addressed through a council's management plan.

## BACKGROUND TO THE EREP

As part of the Solutions to Pollution 1994/96 campaign, the EPA developed a pilot project in partnership with Shoalhaven City Council to respond to these needs. The pilot involved the investigation and development of an Environmental Review and Education Program (EREP) to encourage business and industry to cooperate in reducing their environmental impact.

The pilot project used a cooperative approach to environment protection with an emphasis on establishing networks; gathering information from premises through an environmental review process; and identifying opportunities for working with businesses, industries, and industry associations to find solutions for addressing the environmental impacts identified by the review.

The pilot found that the environmental review was an important and effective step towards improving the environmental performance of small industries. The environmental review, and the follow-up visits after the review, provide an opportunity for one-to-one communication between the reviewer and the business operator. The environmental review assists in: developing knowledge and understanding about environment; identifying the environmental aspects and impacts of the business; encouraging the business person to identify solutions to the environmental problems; and encouraging the development of a plan to improve the environmental performance of the business.

Contrary to popular opinion, the pilot found that operators in small industries and businesses are willing to play their part in protecting the environment but that their resources did not enable them to devote significant time, money or people to do this. Unlike many large industries, small businesses do not employ environmental experts, they do not have environmental policies or plans, they cannot spare the time to attend seminars or training days, and in most cases they don't know where to go to get information or assistance.

The pilot project provided useful information but also indicated the need to do much more in this area. The investment was perceived as worthwhile by the NSW State Government and funds were identified to extend the project to 12 other areas with a focus on priority small industry sectors.

## EXTENSION OF THE EREP

On 19 July 1996 the NSW Minister for the Environment announced an allocation of $320,000 to enable twelve councils to undertake the Environmental Review and Education Program across a range of small businesses and industries.

### Goal and objectives

The goal of the program is to undertake a cooperative local government and industry education project which will result in increased awareness of environmental protection methods and improved environmental practices across a number of small industry and business sectors. The specific objectives of the projects are:

1. to assist councils to gather information from small businesses and industries about current practices and problems in relation to environment protection, with specific focus on priority industries

2. to draw environmental issues to the attention of the business and industry community with an emphasis (where relevant) on their effect on the catchment of their local creek

3. to assist small industry owners, managers and staff to identify pollution problems associated with their operations/practices

4. to assist the staff to identify and implement work practices which have a positive impact on environmental issues

5. to develop industry education programs within a specific industry or business sector with assistance from the industry and relevant industry associations.

### Selection Methodology

One of the key initial components of the program was the identification and prioritisation of small business and industry sectors, and the selection of 12 councils across NSW.

*Selection of Priority Industry Sectors:* The industries with major environmental problems and requiring assistance in environment management were identified through consultation with EPA regional staff and through discussions with councils. All the identified industries were given ratings from 1-5 according to their impacts on air, water, waste and noise. Twenty industries with the highest rating i.e. high environmental impact, were selected. Councils were then asked to submit for project funding and in their submissions to nominate three priority industries from the twenty selected.

*Selection of the participating councils:* Expressions of interest were sought from 63 local councils in 16 NSW urban catchments stretching from the Shoalhaven River in the south to the Hunter river in the north. After a review of the expressions of interest from twenty two councils, 12 councils were selected to undertake this project. These councils received EPA grants and were prepared to contribute significantly from their own funds to the project. The participating councils and their focus industries are:

Bankstown City Council – Wreckers

Baulkham Hills City Council – Shopping centre management

Canterbury Council – Smash repairs, panel beaters & spray painters

Campbelltown City Council – Service stations

Hornsby Shire Council – Marinas, boatsheds & slipways

Liverpool City Council – Nurseries, market gardens, parks & golf courses

Marrickville Council – Chemical treatment, storage & distribution

Newcastle City Council – Printer, film processing

Penrith City Council – Motor vehicle engine repair and servicing

Queanbeyan City Council – Waste oil generating industries

Waverley Council – Retail foods, take away food shops & cafes

Wyong Shire Council – Building construction & demolition

**Project Methodology**

Each council is required to:

- implement an environmental management project concentrating on small businesses and industries
- spend a proportion of the project time concentrating on the designated small industry sector
- develop an environmental education program for the priority small industry in cooperation with the industry and relevant industry association.

The project involves the following three key steps:

- The first step is to establish a Steering Committee to guide and "sponsor" the project in the local community. The committee should have major representation from owners or operators of local industries and businesses and relevant industry associations. It was identified in the Shoalhaven Pilot Project that only 40% of industry/business operators are member of any association, therefore it is also important to involve the individual operators who are not members of any association.

- The next step involves an "on the ground" approach of environmental reviews of small industry premises in the local government area followed by a program of intensive reviews of premises in a specific industry sector.

- The third step requires Council to use the information collected from the environmental reviews to develop, in cooperation with the industry association, an educational program for the priority industry.

The specific needs of the industry would dictate the content and style of the education program, which may include: a self assessment environmental checklist, information sheets for supervisors or managers, posters for operators in workshops, articles for the association's journal, seminars, trade nights, and/or a draft Environmental Code of Practice.

## Project Outcomes

It is anticipated that some of the specific outcomes of the project **for the participating councils and the EPA** will be:

- better understanding of the environmental impact of small industries and businesses
- improved partnerships between local government, the EPA and industry
- the development of a working relationship with relevant industry/business associations with a view to involvement of the associations in environmental initiatives.
- a program of intervention based on the results of the environmental reviews which provides tangible results of improved environmental practices.

The expected outcomes **for local government and small industries & businesses** in NSW are:

- improved environmental practice across a number of small industry and business groups
- twenty four cleaner production case studies - two case studies from each industry/business type
- an education program for the priority industry developed in cooperation with the industry association
- industry specific education materials for the focus industries, which can be used by other councils in NSW.

It is anticipated that the project outcomes will be used to guide future environmental management programs in local areas and that relevant materials developed from the projects will be published in the EPA's Environment Protection Manual for Authorised Officers.

## CONCLUSION

The Small Business & Local Government EREP has many benefits for business, Local Government and the community. They include:

- better environmental awareness and knowledge across the small industry and business sectors
- better communication between Government, industry and the community
- fewer complaints and less conflict over environmental concerns
- improved environmental quality.

Education provides a useful method for local government to work in partnership with small industry and business towards the achievement of ecologically sustainable development as endorsed in Local Agenda 21. Education programs, such as the EREP, also meet community expectations for greater involvement in planning and management of local environments.

Education is a fundamental tool to assist in the transition from an outdated philosophy of "dominance, enforced adherence and pollution control" to one of "motivation, commitment and involvement in a philosophy of cleaner production".

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# Mentoring of Environmental Education Leaders: Stages of the Relationship

**Dr. Carol Fortino**
**Centre for Applied Environmental and Social Education Research**
**Faculty of Education, Queensland University of Technology**
**Kelvin Grove Campus, Locked Bag No. 2, Red Hill, Q 4059**

## SUMMARY

It has been noted that the environmental education movement is accustomed to extraordinary leadership such as the legendary figures of Muir, Leopold and Carson. However, for every charismatic public figure, there are hundreds of unrecognised, but effective leaders whose decisions will make or break the environmental movement (Roush 1992: 4). It is these "quiet" environmental educators who became the basis of a study by Fortino (1996). The leaders included in the initial survey were selected across several environmental networks in Colorado, USA, and Queensland, Australia. Fifty percent of those were willing to nominate the name of their most significant mentor for their work in environmental education. The study specifically examined the effectiveness of the mentoring relationships experienced by these leaders and their mentors. The analysis of thirty "linked" interviews among mentorees, mentors and new mentorees revealed distinctive stages of the relationships. This paper will focus on the five stages of the mentoring relationships for environmental education leaders which include: initiation, development, dormancy, reactivation and sustainment. The findings regarding suggests that future leadership can be encouraged and enhanced by mentoring within the context of environmental education.

## INTRODUCTION

There is a great deal of diversity within the field of environmental education (Smith-Sebasto, 1993). Therefore, engaging a broad range of environmental education leaders across the boundaries of education, academia, government, business and communities was an important consideration in the study on mentoring by Fortino (1996). The leaders were selected by cross-referencing several environmental networks in Colorado, USA, and Queensland, Australia. Fifty-seven respondents to the initial survey gave a self-report of their current leadership roles which included: teachers, volunteers, interpretive naturalists, directors of educational units for companies, university professors, policy makers, environmental trainers, community leaders, cooperative extension agents, foresters, natural resources personnel, authors, consultants, presidents of volunteers organisations, and plant and animal researchers.

To gain an understanding of the commonalities of their mentoring experiences, "linked" interviews were held between the leaders and mentors, the mentors and their own mentors, and the leaders and their new mentorees. The data was collated into mentoring stories between pairs and among triads, chains and webs of mentors and mentorees. The analysis of the interviews revealed five distinctive stages of the mentoring relationships. The findings regarding mentoring suggests ways that future leadership can be encouraged and enhanced within the context of environmental education.

## WHAT IS MENTORING

For the purposes of this paper, mentoring is not to be confused with short-term formal programs, peer coaching, supervisory roles, facilitation, networking, role-modelling without a personal relationship, sponsorship or other mentoring experiences outside the field of environmental education. Instead it focuses on mentors who can be described as guides in life who provide information, support and feedback on personal and professional levels (Segerman-Peck, 1991).

## METHODOLOGY

On the initial survey to the leaders, questions about the characteristics of mentoring relationships were suggested by the study of Roche (1979) and Segerman-Peck (1991). Items on the duration of the relationship and change over time were suggested by the research of Levinson *et al.* (1978), Kram (1983) and Limerick (1992).

A modified version of Seidman's (1991) semi-structured interviews was employed in order to understand the leader's contextual background. Autobiographical techniques allowed participants an opportunity to build their life stories starting from their initial interest in environmental education, its development over time and how their mentoring experience fitted in with their current leadership position and roles. The leaders and mentors were able to sequence and delineate the various stages of their mentoring relationships and were able to reflect on their philosophy and actions in light of that experience. Interviewing the mentor and the mentoree (Kram, 1983) provided information on how the relationship benefited both parties and often the 'personal participant knowledge' of the mentoree was corroborated during an interview with the mentor.

The computer program, NUD.IST, was used to organise and analyse the data by allowing for searches within and across documents and nodes. This allowed patterns to emerge and memos to be written regarding the mentoring relationships. As well, it allowed easy access to the context of the interview in order to extract 'rich' quotes to illustrate various stages of mentoring as found in an environmental education context.

## FINDINGS FROM THE INTERVIEWS

The findings of this study elucidated details of specific mentoring relationships, how they were initiated, developed and sustained over time. Kram (1983) explained her mentoring research regarding the development of relationships in terms of 'phases' - initiation, cultivation, separation and redefinition. This researcher expanded Kram's idea by identifying 'stages of mentoring'. As shown in *Table 1*, the stages in the relationship between the environmental education mentor and mentoree included: initiation, development, dormancy, reactivation and sustainment.

The term 'initiation' indicates the beginning of all the relationships. 'Development' was chosen because it encompasses the idea that the relationship can grow in two dimensions - for both the mentor and the mentoree. Some relationships may experience a period of 'dormancy' which describes what happens when a mentor and mentoree do not have frequent contact. In some cases, dormancy may begin due to a rupture in the relationship caused by personal or professional differences. However, in this study the two instances of rupture were able to be healed and the relationships re-established. 'Reactivation' encompasses the idea that, despite periods of dormancy, the relationship has never lost its original essence and, therefore, does not need to be redefined. Mentors and mentorees attributed this closeness to having a congruent philosophical approach to environmental education. All of the relationships in this study exhibited 'sustainment', that is, a long-term maintenance of the relationship. The average length of relationships was fourteen years with many being over twenty-five years in duration.

## INITIATION - SERENDIPITOUS HAPPENING

An initial attraction between the mentoree and the mentors sparked the beginning of the relationship which was not dependent on a particular career stage. For some, the meeting of the mentor was serendipitous, a 'chance introduction' while they were students. For others, the mentoring began during mid-career. Some subjects explained that they were at stages in their careers where they were 'searching' and the enthusiasm and experience of the mentor helped fill a need. The mentor seemed to have a magnetism and vitality which, coupled with his/her vision of environmental education, was an attraction, while the mentoree revealed a 'spark of

**Table 1. Stages of mentoring relationships in environmental education (Fortino, 1996 after Kram, 1983).**

| Phase | Definition | Turning Points |
|---|---|---|
| Initiation | A period of time during which the mentor and mentoree meet. It may come at early, mid or late stage in the mentoree's career. It is usually informal in nature and is often not acknowledged. | A spark of interest is noted between the two; follow-up may come from either party; similar areas of interest in environmental education are noted particularly teaching techniques and knowledge base. The mentoree is a 'novice' in that they have new knowledge to learn from the mentor no matter their age or previous experience. |
| Development | This stage can last between five and ten years The mentor offers support and encouragement for the mentoree to become autonomous. | During this time the mentorees move to new stages of their career.<br>Networks are shared, opportunities offered. Respect and trust is increased sometimes resulting in cooperative projects. Personal friendship develops, often including families. |
| Dormancy | This stage takes place when there is a period of significant growth on the part of the mentoree often involving a career transition.<br>The mentor's ideas may be challenged and reassessed by the mentoree.<br>There may be periods of rupture and repair due to personal or professional differences. | The mentor is used as a sounding board, advice is sought and often taken. The significance of the relationship is re-evaluated in terms of less constant contact.<br>The professional alliance between the mentoring pair changes and they become colleagues if they work in the same area or as co-lateral peers if they are in different workplaces. |
| Reactivation | Contact is made after a period of dormancy and the relationship is able to easily 'pick up where it left off'. | Realisation that what made the initial relationship valuable to both parties is still intact. There is still a basic philosophical congruence. |
| Sustainment | Some relationships last up to twenty-five years with the average being fourteen years. There may be a reciprocity of mentoring with the mentoree offering new information on a professional level and advice and friendship on a personal level. | Mentorees are not seen as clones, but rather as autonomous leaders, Other mentors may fill new needs, but the original mentor is still valued for their philosophical stance toward environmental education. They often consider each other as equals and definitely as friends. |

enthusiasm'. However, mentor availability and encouragement were necessary aspects for a continuing relationship. Although some aspects of this initiation are the same as in other mentoring situations (Caldwell and Spinks, 1992), the research findings of this study corroborate ideas from the literature that sharing philosophical views is important to the mentoring relationship of environmental educators (Roush, 1992; Gumaer-Ranney, 1992).

### Philosophical congruence

Philosophical orientation was defined by the researcher as a system of personal beliefs based on self-reflection regarding environmental concerns. One participant suggested that 'philosophical' could also be synonymous with 'vision' and 'ethic', a view that matches Aldo Leopold (1949). For some mentoring pairs it was a matter of having common perceptions such as love of the sea, respect for environmental ideas, common belief in conservation and teaching environmental education. Other mentors were credited with being an 'inspiration' or a 'profound influence' and passing on their 'philosophical ideals about environmental education'. Mentors were felt to have changed or enhanced attitudes already seeded in the mentorees' personal backgrounds.

Having compatible belief systems seemed to be a forerunner to gaining mutual respect for one another. And yet, the subjects advocated that philosophical beliefs should be underpinned not by emotion but with scientific knowledge and sociological understanding. The discussion about how far one was prepared to compromise their philosophy suggested developmental aspects of mentoring relationships. In essence, the subjects felt that both mentors and mentorees should understand and reflect upon their own philosophical orientation to environmental issues and towards education. One female, early in her career said of her mentor, "We had similar belief systems, and had mutual respect for one another ... he saw that I had integrity in my work (it came from the heart); and I would ask his advice when appropriate". Others cited that the mentors demonstrated that they were "practicing what one preached" and "cared for the environment". Other comments which embody this philosophical congruence are:

> *I think if people can connect on that spiritual, that values level, that is where the relationship starts and all the other facts and figures come a lot later.*
>
> *I don't think we ever sit down and talk about environmental philosophy, because both of us understand each others' position because we have worked together for so long, it is just accepted.*
>
> *I think that was a philosophical thing we agreed on and both believed that the kids do it. Of course, we argued the whole time or disagreed or debated everything. I think we always listen to what the other person has got to say.*

### Timing of the relationships

Another important finding in this study is that the initiation of the relationship did not always happen when one was young or just beginning in their career. This condition is demonstrated by the two comments below:

> *I was at the stage of wanting to change what I was doing and how I was presenting environmental education concerns. This mentoring relationship provided what was lacking at that point - a new program to centre on. (leader in mid-career)*
>
> *I already had twenty-five years of experience in natural resources when I met her. (leader in late career )*

As can be ascertained from the participants' comments, the mentor played a significant role in encouraging the mentoree, offering new challenges and opportunities.

### Exchange of expertise

Some participants deliberately chose their mentor to pursue graduate work. This led to an exchange of expertise. One person was drawn to his mentor in mid-career because of "increased awareness of broader education issues and requirements to bring about change through education". For others, the specific area of environmental knowledge was important.

> *There was a demand for me to have information and provide it to schools seeking of better tools/method of teaching for university lecturing.*
>
> *The program being developed - Rivers of Colorado Water Watch Network.*
>
> *My interest in his knowledge of natural history, specifically birds and butterflies.*

This need for specific guidance in environmental education points back to the special characteristics described for an environmental education mentors such as having a broad-based knowledge, demonstrating a personal ethic and passion about the environment, modelling appropriate techniques and balancing theory with practice.

## DEVELOPMENT OF THE RELATIONSHIP - CONSIDERED CONTACT

An initial attraction between the mentoree and the mentors sparked the beginning of relationships, but it was not dependent on a particular career stage. Availability was important to the development of the relationship but it was almost more a state of mind than a physical reality as contact did not need to be on a constant basis. The relationship continued to develop for a variety of reasons. Some had mentors who were university academics who helped them when they were changing courses or during post-graduate study. One mentoree did not underestimate her own initiative and willingness to be mentored when she wrote:

> *I think a lot had to do with my interest, enthusiasm, and the willingness to take risks. I was a good student and worked hard. He was willing to let me tailor my student teaching experiences to teach two different weeks at the outdoor lab school, taking time off in between. He was unconventional and a real person - not some superior professor.*

Other characteristics that kept the relationship growing was an openness and modelling on the part of the mentor, the mentorees growth in self-confidence and joint outside interests. One person noted:

> *I was inexperienced and lacking confidence. My knowledge of environmental education, aims and principles were only beginning to develop. My mentor gave guidance and advice and assisted in arranging opportunities for my professional development. My mentor was often a model.*

Many of these mentoring experiences began with infrequent meetings and this increased as the relationship grew; yet for others, the opposite took place. In effect, the pairs sought their own 'comfort levels' regarding the need to have contact. This data contrasts with the literature findings about formal programs where meetings are regularly scheduled (Shea, 1992). The mentoring pairs reported that the relationships were seen as effective when bonds of personal compatibility and professional complementarity were forged between them.

### Personal Compatibility

The leaders in this study substantiated their mentors' personal influence with explanations about mutual support, a gain in scientific knowledge, especially biology, and learning political awareness. The mentor's approval and ability to bolster the mentoree's self-confidence through a personal interest was significant in that it could sometimes result in the mentoree making new or enhanced career changes. This influence is substantiated through the participants' comments:

> *He was encouraging and made me feel competent. He appreciated my sense of enthusiasm and allowed me to feel like I could accomplish anything.*
>
> *She was more like a guide for me and reaffirmed what I believed.*
>
> *He was interested in my personal life. We had common interests - scouting, hiking, outdoor activities. He made me feel comfortable with his family.*

### Professional complementarity

Sometimes the mentors and mentorees were in the same workplace by necessity, sometimes by choice, but often they worked in different aspects of the same field, occasionally in different cities and even different countries. Yet despite physical distance, there was often a professional complementarity of experience and skills and they were able to assist one another with projects. The relationships kept developing, helped by an openness and modelling on the part of the mentor, the mentorees' growth in self-confidence and joint outside interests. As with the personal dimension of the relationship, increased self-efficacy of the mentoree can spill over into the professional career even if the mentor can be of no help in securing a job. Two participants wrote:

> *She gave me the continued belief in myself and the incentive to constantly strive to follow her example.*
>
> *He did not help me find a job or develop educationally - just helped with the desire to do so on my own.*

As reflected in the literature (Udall, 1986 and Beeler, 1988), having a mentor can make one a better practitioner of environmental education by learning new approaches, broadening contacts, developing the mentoree's programs and increasing political nous. These participants noted that sometimes their mentors were able to assist in their career paths by substantiating their choices or providing new opportunities.

As the mentorees became more interested and involved in environmental education, they often realised how knowledgable their mentors were and called on them more often. Topics of discussion between the pairs included the need for environmental education, finding enjoyment in the field, and understanding the philosophy and politics underlying it. The subsequent increase in knowledge sometimes led to a delegation of responsibility from the mentor. It can be seen that mentors influence the careers of mentorees through their encouragement, sharing expertise, offering new opportunities, and sharing their networks.

## RUPTURE AND REPAIR - THE ART OF RECONCILIATION

Two instances of rupture to the mentoring relationships were reported in the study. In both instances the mentor and mentoree triangulated the information about this event in their separate interviews. One instance dealt with the mentoree being promoted over the mentor. That rupture lasted over one year, but was repaired when both parties realised the depth of their personal friendship and that their professional skills were more compatible than competitive. The second example was based on a philosophical rupture during a joint project. Both parties admitted to having 'volatile' personalities. They later mended the rupture to the extent that they supported one another during personal illnesses. Today they work together on selected projects, and although the mentoring relationship is characterised as a 'bit more cautious', they are both willing to accept advice and reciprocal mentoring from one another when needed.

These findings contrast with the results of Levinson *et al.* (1978) who reported that an intense mentor relationship can often end with conflict, bad feelings and even hostility on both sides. Other reasons for the possible break-up of a mentoring relationships (Carruthers, 1993: 18-19) include intimacy leading to acrimony, jealousy of the mentoree's peers, blocking the advances of the protégé, perceived professional intimidation, spouse jealousy and threats from cross-gender mentoring. These factors were not found in this study and may be attributed to the fact that most mentoring in environmental education is informal, voluntary, based on philosophical congruence and non-hierarchical thereby avoiding the pitfalls of business or academic competition.

## DORMANCY AND REACTIVATION - OUT OF SIGHT, NOT OUT OF MIND

Many of the mentoring relationships went through periods of dormancy, that is periods of little or no contact due to change in employment, moving, illness and retirement. For some it was only intermittent telephone calls or letters two or three times a year. A few pairs rarely had contact as they were in different countries. One person retired and the pair lost contact for six years, but have begun writing once again. Some were also able to keep tabs on one another through mutual networks or a 'circle of friends'. The subjects had varying opinions on how the reactivated relationships were perceived, citing: little to no change, deeper understanding, less reliance on the mentor, and developing their own vision. Reactivation of the relationship was often explained as being able to 'pick up where they left off'.

> *So we have written back and forth a few times and I am still seeking his guidance and asking his opinion and also letting him know where I was.*
>
> *He and I still touch base from time to time. He is retired now and doing problem-solving meeting as a facilitator. Ernie called me last summer ... and said he was in town and it was like no time had passed between us at all.*
>
> *No, I don't think that we have to backtrack. We actually bump into each other or through our connections it is so constant that we don't really lose touch.*
>
> *I suppose the only thing that would change is I don't spend as much time with her ... .but we can pick up where we left off.*

## SUSTAINMENT - CONGRUENCY, COMPLEMENTARITY AND RECIPROCITY

This study found that even when career paths veered, a supportive continuation of long-term relationships was possible. This interpretation agrees with the findings of Roche (1979) who reported sustained relationships as 'friendly' and 'close'. Even though the mentorees were encouraged to branch out and develop their own vision, there was still a sustainment of the relationship which, for many, lasted over twenty years. This is an important finding in that it contrasts with the literature especially from business (Shandley, 1989), nursing (Donovan, 1990) and education (Caldwell and Carter, 1993).where short term relationships are described and sometimes even encouraged.

## RECIPROCITY OF MENTORING

An important finding of this study was the reciprocity of mentoring between the mentor and the mentoree, an idea mentioned in the mentoring literature (Daloz, 1986; Gehrke, 1988; Segerman-Peck, 1991). The essence of this idea is well stated by three subjects who commented:

> *I am and will continue to mentor, it's on-going and cyclic. I still have my mentors and I mentor others . Een the ones I mentor often re-mentor me.*
>
> *I have probably learned as much from her, if not more, than she has from me. If anything, I would say she has really mentored me rather than I have mentored her.*
>
> *Our fifteen year relationship is reciprocal.*

What is important in these long-term relationships is that they have moved from being vertical (mentor passed down to mentoree) to horizontal (mentoree across to mentor). Rather than becoming static, they continued to grow and change. The mentoree could return professional advice, new information and continued friendship to the mentor on a equal basis. Again this research establishes that even when the mentors and mentorees felt that they became 'equals', there was no need to dissolve the mentoring relationship. This finding confirms the research of Daloz (1986: 58) who offered this advice, "If the mentor is capable of letting go of that power so that the relationship can be genuinely reciprocal, the odds favour a lasting friendship". It is not suggested that mentorees necessarily pass through all of these phases in a lock-step progress (Sheehy, 1976). Indeed, three patterns of sustained mentoring relationships seem to emerge most frequently and these are depicted in *Table 2*.

Firstly, the most frequent type of relationship followed the stages of initiation, development and sustainment where mentorees stayed in touch with their mentors over many years. They reported continuing professional discussions regarding environmental education while their personal relationship grew and, for many, involved becoming family friends. Secondly, some relationships included a period of dormancy and then reactivation which was often caused by circumstances outside the control of the mentoring pair. This could include job change, travel and changes in personal circumstances. When the pair made contact again, the relationships picked up easily and continued for a long time. Sometimes there was a different level of maturity in the resumed relationship consistent with the broadening experiences and growing expertise of the mentoree. Thirdly, a rupture developed for some mentoring pairs due to personal or philosophical differences. These relationships were able to be repaired by a sense of goodwill and effort on both sides and continue even now. The duration and length of the sustained mentoring relationships found in this environmental education research context demonstrates an important difference from the general mentoring literature. Participants attributed this finding to their shared philosophical outlook on the importance of environmental education.

In summary, leaders, mentors, and new mentorees involved with environmental education described how the influence of their own mentors helped them become effective agents of change. The influence of mentors encouraged the mentorees to lead from a level of self-actualised reflection based on a philosophically congruent view of environmental education. That leadership is demonstrated through their "quiet" accomplishments and continued work in the field. It has been seen that mentoring can benefit leaders who are then better able to encourage environmental knowledge, values and beliefs necessary for a sustainable world. The understanding of these past experiences leads to implications of mentoring for the professional development of future leaders in the field of environmental education.

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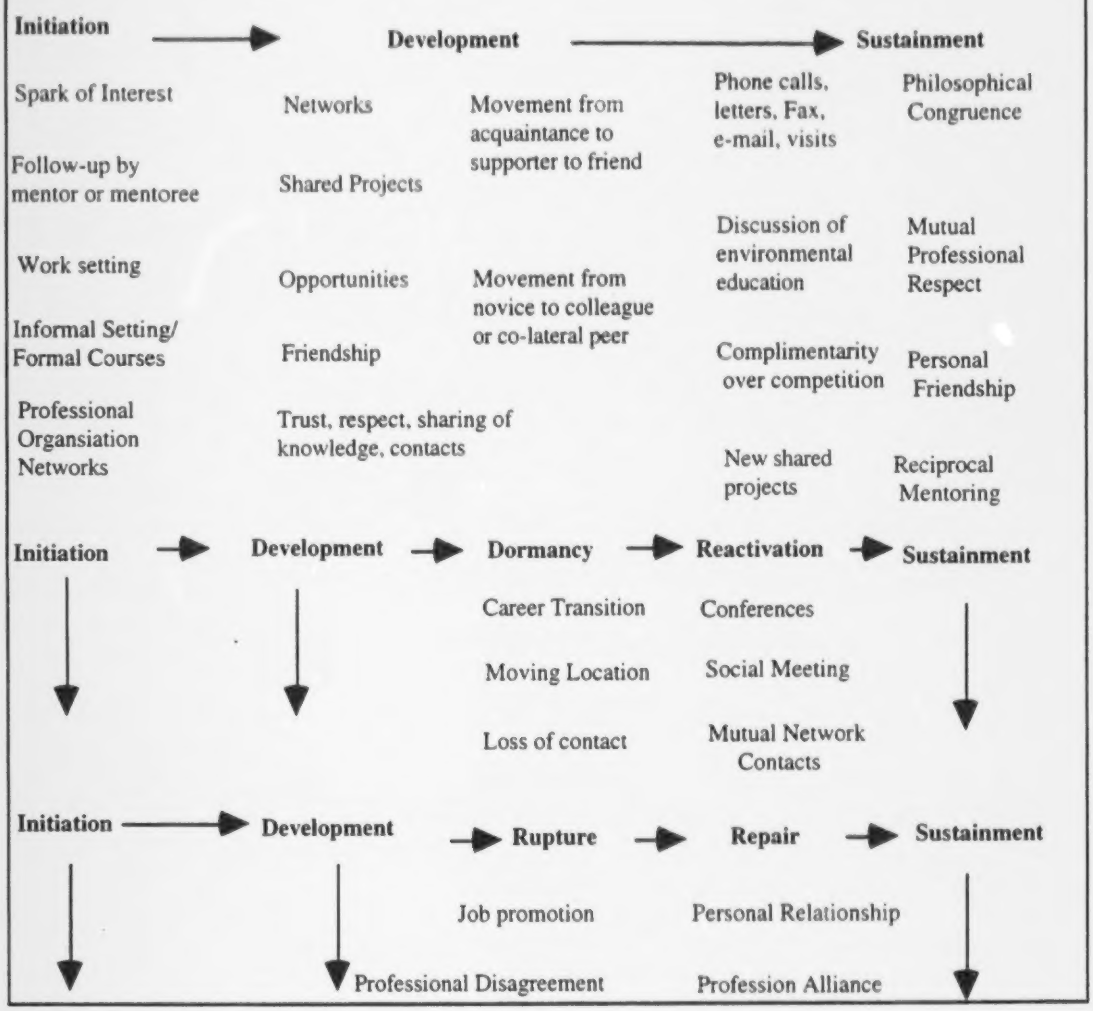
**Table 2. Stages of mentoring development in environmental education (Fortino, 1996).**


Initiation
Development
Sustainment
Spark of Interest
Follow-up by mentor or mentoree
Work setting
Informal Setting/ Formal Courses
Professional Organisation Networks
Networks
Shared Projects
Opportunities
Friendship
Trust, respect, sharing of knowledge, contacts
Movement from acquaintance to supporter to friend
Movement from novice to colleague or co-lateral peer
Phone calls, letters, Fax, e-mail, visits
Discussion of environmental education
Complimentarity over competition
New shared projects
Philosophical Congruence
Mutual Professional Respect
Personal Friendship
Reciprocal Mentoring
Initiation
Development
Dormancy
Reactivation
Sustainment
Career Transition
Moving Location
Loss of contact
Conferences
Social Meeting
Mutual Network Contacts
Initiation
Development
Rupture
Repair
Sustainment
Job promotion
Professional Disagreement
Personal Relationship
Profession Alliance

# "Project WILD" - A Curriculum Innovation for Environmental Education: its usefulness beyond the university coursework boundary

**Dr. Carol Fortino and Dr. Tammy Kwan**
**Faculty of Education**
**Queensland University of Technology**
**Kelvin Grove, Locked Bag No. 2**
**Red Hill, Q4059**

## SUMMARY

University courses employ a variety of teaching practices and learning resources including: lectures, books, journal articles, videos, discussions and hands-on activities which can encourage critical and reflective judgement. Through these techniques, students' learning should move from awareness to acquisition of knowledge, to adoption of relevant information, to assimilation for their own use, and finally, to critical self-evaluation of how it relates to new situations. This paper reports a research study by two university lecturers which evaluated the integration of an environmental education curriculum innovation within several of their university courses. Project WILD was selected since it stresses practical hands-on learning and cross-curricular integration for environmental education. This paper also examines the usefulness of these materials for students beyond the university coursework boundary and addresses its filtering effects into schools and other workplaces.

A grant, obtained from the Centre for Applied Environmental and Social Education Research at QUT, allowed the investigators to establish if students who had been introduced to Project WILD remembered or used these materials after they left the course. Half of those contacted by telephone remembered the Project. Forty percent of that number recalled Project WILD without being prompted, while ten percent remembered after specific activity titles were suggested. On their own initiative, three people went on to take a full Project WILD workshop which was facilitated by the university lecturers outside of the regular course schedule. Others have used the materials in various ways in non-formal education. These findings suggest that being introduced to practical, hands-on activities within a university course can engender a positive impression of environmental education. This can lead to students adopting and/or modifying the curriculum innovation to suit their subsequent school and work place needs.

## CONTEXT FOR THE RESEARCH

Guidelines for effective university teaching (Australian vice-chancellor's Committee, 1993: 1-2) regard teaching as a creative activity designed to foster student' learning, to provide students opportunities to be involved in structuring their own learning experiences and to help their development as a whole person. It is imperative that university students receive a positive impression regarding their ability to understand and teach effectively about environmental education, an important cross-curricular area. Debating environmental issues in university education courses allows students to clarify their own ethical stance. It also sets the stage for them to learn how to teach the three As, namely: awareness, attitude and action (Fien, 1993) for the environment. The Bachelor of Education and Graduate Diploma in Education programs offered by the Queensland University of Technology have a number of courses which emphasise environmental education.. In order to make these courses more relevant for a variety of students and to encourage them to take reflective action, an innovative environmental education component, Project WILD (Western Regional Environmental Education Council, 1992), was integrated into the regular course syllabus.

Project WILD is an internationally acclaimed training program for environmental education which originated in the USA and has been sponsored in five other countries: Canada, India, Iceland, Sweden and the Republic of Czechoslovakia. The goal of Project WILD is to assist learners of any age in developing awareness, knowledge, skills and commitment which may lead to informed decision-making, responsible behaviour and constructive actions concerning wildlife and the environment upon which all life depends. The project materials are designed with great emphasis on practical, interdisciplinary activities. These materials are not sold for profit and may only be accessed through training in low-cost workshops or through university courses.

## THE RESEARCH FOCUS

Substantial research on Project WILD (Charles, 1988; Western Regional Environmental Education Council, 1990) has been conducted in the United States on users and non-users of the project. The findings showed that users of Project WILD indicated a moderate increase in teaching time devoted to wildlife with participating teachers choosing activities to fit into their existing curriculum. The educators also reported an increase in student knowledge and awareness of wildlife and related issues. In Australia, anecdotal feedback from the QUT courses showed that this type of hands-on environmental education was effective, however no formal evaluation had been carried out. Therefore, a grant was obtained from the Centre for Applied Environmental and Social Education Research (CAESER) to establish and evaluate the extent to which students who had been introduced to Project WILD through a university course remembered and/or used these materials in a setting beyond the tertiary interface. The outcomes of the findings could suggest effective strategies to promote environmental education in both pre-service and in-service teacher education in an Australian context.

## THE EXTENT OF THE RESEARCH PROJECT

The research sample involved students who had been enrolled in selected environmental education courses taught by the lecturers/investigators which have been offered since semester 1 of 1993 through to semester 2 of 1995. These courses were mainly confined to two programs, namely, the Bachelor of Education (in-service) which involved a small cohort of students who were introduced to different Project WILD activities in more than one context, and the Graduate Diploma in Education where students chose environmental education as an elective. Some students took the courses through an external mode of delivery.

An effort was made to contact all eighty-nine students who were introduced to Project WILD during their course work. Eight students were unable to be located. The remaining eighty-one students formed the sample for the survey. Five students who now live overseas were sent a questionnaire by mail. Between February and March 1996 a research assistant attempted to survey the remaining seventy-six students by telephone. Table 1 gives a breakdown of the number of students who were contacted at least twice during the survey period.

**Table 1. Survey sample for the research study.**

| Course Code | Course Title | Date of Offering | Survey Sample N=81 |
|---|---|---|---|
| Graduate Diploma in Education-Program: specialising in Environmental Education | | | |
| SBP 504 | Practical Fieldwork in Environmental Education | Semester 1, 1993 | 11 |
| SBP 503 | Natural Environmental Education Issues | Semester 2, 1993 | |
| SBP 505 | Social and Environmental Education Issues | Semester 1, 1994 | 7 |
| SBP 504 | Practical Fieldwork in Environmental Education | Semester 2, 1995 | |
| Bachelor of Education (in-service) Program: elective course (*external offering) | | | |
| SBB 400 | Environmental Education | Semester 1, 1993 | 19 |
| *SBB 440 | Environmental Education | Semester 1, 1995 | 35 |
| *SBB 440 | Environmental Education | Semester 2, 1995 | 9 |

## THE INTERVIEW METHODOLOGY

A structured questionnaire was designed to collect information about the students' recall and uses of Project WILD materials in their current situation. Those reached by telephone are referred to as participants and their responses were noted on a tally sheet for subsequent interpretation and analysis. The questionnaire asked if the participant remembered being introduced to Project WILD during their course at QUT. If they did not remember, they were prompted by the names of activities such as: "Dragonfly Pond", "No Water Off a Duck's Back" or "Ethi-Reasoning". For all those who remembered, they were asked if they had incorporated the activities into their current work. For example, if they were teachers, had they used the materials in practice teaching or full-time teaching, indoors or outdoors, and which subjects were targeted for the use of Project WILD materials? If the graduating students had gone on to other types of employment, they were asked if they found the Project WILD materials and ideas useable in their workplace situation. If yes, how had they used the materials?

The participants were also queried about attending any Project WILD workshops on their own time, cost and initiative. If they had attended, it was important to know if they had heard of the workshop through their lecturer during the course or later on through advertisements. Also, were they still receiving the periodic Project WILD newsletter? For those who had not used Project WILD activities or had used them only on a limited basis, they were asked what they would need to use the materials more extensively.

## SURVEY FINDINGS

No response was received from the five who were contacted via mail to the UK, Hong Kong and Papua New Guinea. As shown in Table 2, thirty-four students were successfully contacted and participated in the telephone survey. Out of this, forty percent recalled Project WILD without being prompted, while ten percent remembered after specific activity titles were suggested. The fifty percent who did not remember took the courses mainly through correspondence mode.

**Table 2. Recall of the Project WILD curriculum innovation by the participants.**

| Number of Participants N=34/81 | Recall of Project WILD | Percentage |
|---|---|---|
| 14 | Remembered Without Prompting | 40% |
| 3 | Remembered After Prompting | 10% |
| 17 | Did not Remember at all | 50% |

## IMPACTS OF THE PROJECT MATERIALS

### *Use of curriculum innovation*

Among the 17 students who remembered being introduced to Project WILD during their course of studies at QUT, about half used some of the activities as presented by the lecturers. Further interest was shown in the curriculum innovation in that a quarter of those students independently used other ideas from the Project WILD materials that were not presented in the environmental education courses.

Seven former students who currently held teaching appointments at the time of the telephone survey had incorporated activities into a range of subject areas such as environmental science, social studies, art, physical education, mathematics and citizen education. They all rated the activities as very successful. Six of those teachers had made adaptations and modifications to the materials to make them more relevant to their use in an Australian context.

The participants who remembered Project WILD were also asked if they used the activities in conjunction with other environmental education programs. Three reported that they used Project WILD with materials from the Department of Primary Industry, in particular, Land Care, Water Watch, Pasture Watch and Salt Watch. They also reported that they had used

Project WILD to complement other professional development initiatives such as effective teaching and learning, key learning areas, critical thinking, complex reasoning, the Australian curriculum statements and profiles and computer education.

Among those who remembered Project WILD, but had not used these environmental education activities, were a relief teacher, a continuing higher degree student, a TAFE teacher and a commerce teacher. They explained that the activities introduced in the course relating to Project WILD were unsuitable to their job situation at that time.

### *Course work extension - Project WILD workshop*

Crowther and Gaffney (1994) charted the characteristics of best practice in professional development. They promoted seven steps for application of ideas presented in workshops including: follow-up; demonstrated; sense of ownership; practicality; rewards; and transferability of learning. These principles were demonstrated by some of the participants when the lecturers of the QUT courses notified their current and former students of the opportunity to attend Project WILD workshops. Over twenty workshops have been held around the Brisbane area since 1992 attracting over 170 fee-paying participants including former pre-service students from the QUT courses involved in this survey.

Four students, introduced to Project WILD on a continuing basis within their university program, have gone on to become facilitators for the Project. They have also designed new Australian activities and helped with newsletter production. Three other students took a full Project WILD workshop on their own initiative while they were still pursuing studies at QUT. One graduate took a job with the Forestry Department and adapted materials from Project WILD to use with over 300 students for World Forestry Day. Another student who worked outside of formal education used the materials with the Greening Australia Organisation in a community environmental education setting.

## TRACKING THE EFFECT

### *Networking*

Ten Project WILD newsletters have been produced over the last four years to encourage networking of environmental educators with other groups such as the Gould League, Landcare and the Department of Environment and professional organisations such as Geography Teachers Association of Queensland (GTAQ) and the Science Teachers Association of Queensland (STAQ). Included in the newsletter are photographs of former students interacting with classroom teachers, as well as community and personnel from natural resource agencies. To encourage adaptation of the activities. the newsletter features an article called "Accent on Australia" which gives information about local wildlife such as the turtle and whale migration. Also highlighted are articles by workshop participants who have written new Project WILD activities which they have tried out with various groups. These activities will be incorporated into the first Australian Project WILD book which will be printed after the international sponsorship rights are secured.

### *Future Participation*

As professionals, university educators need to become appropriate role models and exhibit a commitment to life-long learning and personal and professional growth (op. cit.: 1). The team of facilitators includes the original two university lecturers, a female high school biology teacher, and a male primary teacher who was one of the first group of students at QUT introduced to Project WILD. As well, other students who show an interest in becoming workshop leaders are invited to join this group to learn facilitation skills. Additionally, three other former students have become part of the facilitation group. The course co-ordinators of the workshops aim to use a multi-agency team to present the workshops so that people will understand that Project WILD is a complementary program for other Australian environmental education materials. Therefore, former student-facilitators join professionals from the Department of Primary Industries, the Brisbane Department of Housing, Landcare, Waterwatch, the Marine Education Society and the Department of Fisheries.

By being kept active on the newsletter network or by participating in workshops, former students can be introduced to a wider mix of environmental educators thereby opening up contacts and opportunities for employment. An example of this cross-fertilisation is a recent workshop which targeted the needs of three distinct groups:

- Ecotourist Kid's Club Directors at resorts who entertain with games, yet teach something about the attractions the resort has to offer such as whales, wetlands, ponds and reefs;

- Educators who have access to water resources such as the ocean, rivers, lakes, streams, wetlands or ponds and want to make the most out of teaching in, about and for the environment; and

- Natural Resource Personnel who deliver environmental education programs to the community and schools about landcare, planning, and water pollution.

The Project WILD approach to education for school children, university students or community based groups is to demonstrate hands-on and minds-on activities which create the climate for participants to evaluate their own ethical position regarding the environment. This philosophy follows the project's principles of teaching people how to think, not what to think. Therefore, environmental issues are represented from many points of view - green, industry, community and government. This approach also fulfils the best practice characteristics for a course or workshop where both structured and unstructured time is included so that participants are able to reflect upon implications for their professional practice (Louden, 1996: 12).

## SIGNIFICANCE OF THE RESEARCH FINDINGS

It is important to note that 15 students from the telephone survey had taken their courses by external mode of delivery. Seventy percent of these did not remember or recall Project WILD. This suggests strongly that when students read secondary information (Dahlgren, 1995) by themselves, lack the opportunity to interact with the lecturer and fellow students and do not directly experience activities, the effectiveness of curriculum innovations like Project WILD can be minimal. This problem can be overcome by including videos in the open learning materials which demonstrates a hands-on approach for practical environmental education activities.

Forty percent of the 34 participants described what they would encourage them to use the Project WILD materials more often. They expressed a need for greater opportunity to learn about the project and to have cross references to current curriculum materials as used in schools. They also look forward to the Australian adaptation of Project WILD. Sixty percent of the participants indicated that they would be willing to take a workshop in the future. This has serious, but positive implications for universities.

This research suggests that universities which introduce innovative materials in their courses need to provide further follow-up for interested students if the potential for these environmental education materials are to be utilised. This is true, not only for Project WILD, but also for other programs such as Landcare and Waterwatch from the Department of Natural Resources, which have recently been introduced in environmental education courses. One way for universities to support curriculum innovation is to offer continuing education courses. Support can be maintained for students even after they have graduated by keeping a database of people in environmental education courses to whom workshops and advanced courses are periodically advertised.

If further workshops were organised through independent sources such as professional organisations for geography or science, then students attendance would be encouraged through discounted fees. This not only benefits the student monetarily, but encourages membership and professional affiliation. This may lead environmental education being taught throughout the careers of the participants..

When university professionals are also the Project WILD workshop facilitators, students get to see another side of the lecturers which includes their personal commitment to environmental education, a demonstration of their own continuing professional development and provision of community service within a wider spectrum. These shared experiences during the implementation of a new curriculum innovation extend the bonds between students and university professionals beyond the coursework boundary.

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# Critical Thinking and Action Learning in Education *for* the Environment: Some Insights from Learning and Teaching with Unemployed Young People

**Graeme Gibson**
**Community and Environmental Education Consultant**
**67 Bonython Street Downer ACT 2602**

## SUMMARY

Youth unemployment and environmental degradation are two critical issues facing Australia today. This action research study concerns learning and teaching with participants in a government labour market program (LMP) which was established to address these two issues.

The study evolved to consider whether critical thinking and action learning can enhance self-concept and environmental education for unemployed young people. The research provides a positive response to this problem, although certain limitations are noted. Conclusions are drawn in five areas. These relate to 1) environmental attitudes, knowledge and action; 2) approaches to environmental education and learning; 3) the impact of unemployment, peer pressure and mass culture; 4) the integration of action learning and critical thinking strategies into the learning and teaching; and 5) the individual participants life history and prior knowledge and experience of environmental issues. A number of recommendations are also made.

## INTRODUCTION

This paper relates to research done with participants in the Landcare and Environment Action Program (LEAP). The LEAP program consists of both on-the-job and formal training. The formal training includes a 40 hour core unit of environmental studies – "Conservation Concepts" – which is the subject of the learning and teaching.

Many young people undertaking LEAP programs are disadvantaged beyond just unemployment and are alienated from society. School has sometimes been a disabling process and the transition to adulthood has been delayed by unemployment. Along with much of the general population, there is widespread disconnection from nature which contributes to environmental apathy.

Linking unemployment problems with environmental problems goes back at least as far as the Community Employment Program – a government LMP of the early 1980s. More recently other programs (Jobskills, New Work Opportunities) provided an environmental focus to LMP's. These responses may be seen as an extension of community participation in natural resource management which has become established in Australia in recent years. Carr (1993) referred to the devolution of responsibility for ESD to 'the community'.

Eckersley (1989, 1992) considered issues associated with combining unemployment programs and environmental restoration and identified potential environmental, economic and social benefits. Eckersley (1995, pers. comm.) has also pointed to research which shows that although youth in Australia have a pessimistic view of the probable future for Australia, the preference is for a much greener future. He also considers that the psycho-social consequences of cynicism, disengagement and a sense of dismay among youth have been largely overlooked.

White (1990) has been critical of the education and training solution of government policy for youth and various mechanisms which lay the blame for youth unemployment with the young unemployed themselves. He highlights the trend towards increasingly vocational education and training aimed at obtaining a full-time job, at a time when full-time job opportunities are disappearing.

## RESEARCH METHODOLOGY

The study has followed an action research methodology and involves three cycles of the three phases of planning, action and reflection. In common with much sociological research, action research provides the opportunity to focus not so much on finding the answers to known questions, but with finding the significant questions.

Action research may be either individual or collaborative. There is a strong history of individual action research, going back to the 1940s, for example Lewin (1946). An individual approach to action research has been adopted in this study for two reasons. Firstly, it was felt that having more than one person working with LEAP participants would be likely to create more difficulties than benefits. There was considered to be a strong likelihood that some participants would withdraw further from a new and different approach. Secondly, there was no possibility of working collaboratively with one or more other teachers – they were simply unavailable.

Robottom and Colquhoun (1993) in an action research project with a group of young people, observed the insecurity of some participants at a new-found lack of external direction. They have concluded that participatory action research is of a particularly fragile nature when applied to a group that is relatively powerless. In addition the relationship between adults and children in participatory action research is easily abused by adults, either knowingly or unknowingly.

Wals (1992) has said that action research and phenomenology require the researcher to take the role of the observer, interpreter and participant. Phenomenology is an approach that is concerned with the insiders point of view (Kellehear, 1993). Parer (1992) refers to phenomenology as knowledge gained directly from experience. Schon (1983) has discussed in detail the concept of reflection in action as a vital component of professional behaviour. He describes reflective conversation with the situation (p.268) as “artful inquiry by which (practitioners) sometimes deal with situations of uncertainty, instability and uniqueness”.

### Research Design and Processes

Three cycles were chosen for the research for two reasons. Firstly, these cycles provided adequate opportunity to develop and reflect on my approach to the learning and teaching. Secondly, the opportunity for teaching two groups in three separate cycles was reasonably assured. Beyond these groups, there was much less certainty of any teaching being available.

Each cycle has involved two groups as shown below.

| Cycle | Group | Time frame | Start | Finish |
|---|---|---|---|---|
| 1 | A | April - July 1993 | 15 | 10 |
| | B | | 12 | 6 |
| 2 | C | August - November 1993 | 26 | 16 |
| | D | | 12 | 12 |
| 3 | E | January - May 1994 | 10 | 7 |
| | F | | 11 | 10 |

*Time frame and participant numbers for the groups in the 3 action research cycles*

### Data Collection

This study has drawn evidence from a number of different sources including participants, supervisors and other teachers using a range of participatory methods. Questionnaire surveys were completed by 122 LEAP participants to assess environmental attitudes, knowledge and action. Individual, informal, semi-structured interviews were carried out with participants in the final 2 groups before the teaching commenced. Focus group discussions were regularly used to obtain insights into participants attitudes and knowledge on an issue. Structured group discussion and individual evaluation became important parts of the learning and teaching.

In addition, participant observation (Kellehear 1993, Wadsworth, 1984) were used on an on-going basis throughout the research. These were recorded in my journal for all groups and allowed an accurate record of my observations and interpretations of events.

### Limitations of the research methodology

Throughout the actual research some areas of weakness in the methodology used, have become evident. These are not seen as debilitating to the research, or corrupting the validity of the process or outcomes – they reflect the 'real life' nature of action research.

- The differences between participants and the projects in the three cycles were quite significant, but also quite typical of LEAP projects.
- No consistent or reliable, independent verification was available. The research lacked a committed, enthusiastic group to work with.
- Considerable variation occurred in the method of delivery of the training and the timing of Conservation Concepts within the overall LEAP program.
- My presence or familiarity as a LEAP coordinator may have had an affect on some participants perceptions of the unit Conservation Concepts and the approach to the learning and teaching.
- Questionnaires are not wholly appropriate for an alienated group or where literacy may be marginal.

## ACTION RESEARCH: PROCESS AND OUTCOMES

> "When I was 15 I got a job out bush with some sleeper cutters. They paid me well and treated me all right. Every night we went to the pub and got pissed. At the time I thought it was OK".
> quote from male participant in group A

> "When the LEAP course started we looked forward to the training at CIT (TAFE) as a break away from the work at (ACT) Forests. Now we look forward to Forests to get away from CIT".
> quote from male participant in group B

> "Sure it's good to turn the tap off while cleaning your teeth but it's not going to make much difference. What about all the shit (pollution) that goes in the rivers?"
> quote from male participant in group A

> - Peter – hitchhiked to Canberra from Western Australia just before the LEAP course started after family troubles. Had on-going accommodation difficulties in Canberra but sorted out his family problems and decided to return home after the LEAP course finished. To save money after his last accommodation problem, he camped, mainly alone, on the banks of the Murrumbidgee River for about 7 weeks. His shelter was heavy duty cardboard packaging and plastic sheeting.
> - Rebecca – had been separated from her family, with only irregular contact, for many years. She found difficulty in any learning situation, had extensive contact with the juvenile justice system and was a long–term client of a youth support agency.
>
> edited extracts from my journal – participants in groups C & D

> "You asked us to help plan what we were going to do and then ....... gave us worksheets. Just like school".
> quote from female participant in group C

> "Today Greme (sic) and the group us leaps, tried to learn about the local native plants which doesn't really appeal to me because I am thinking about other things that are important like money. Really I give Greame (sic) credit for putting up with us as a few of us dont participate much including me. If we all gave Grame (sic) a chance he wouldnt get so frustrated and get cranky. Really this course is a waist of time to those who dont want to learn so I dont see any point coming. But those who have to pay flat bills like me have no choice but to come or if I dont turn up anymore I wouldn't be able to survive".
> extract from female participants journal – group E
>
> (Thanks mate; sorry for being cranky – authors' note).

Planning for the first cycle of the learning and teaching primarily involved a curriculum review and development of a flexible program. On reflection after the learning and teaching, three areas were identified as needing further research. These were;

- environmental attitudes, knowledge and actions
- compatible approaches to environmental education
- the impacts of unemployment, peer pressure and mass culture.

These areas for further research then became the subject of the planning phase for the second cycle. In reflection on the second cycle two areas for further research were identified as;

- strategies for integrating action learning and critical thinking
- the effect of individual participants life histories and previous knowledge and experience of environmental issues.

And these two areas became the subject of the planning phase for the third cycle.

**Observations and Reflections**

- Distractions are everywhere. During a 'Reading the Landscape' exercise atop a hill adjacent to one groups project site, all was well with high levels of participation. The exercise involves observation and imagination along with some creative thinking and recall of known basic ecological facts. All was well that is, until one participant discovered a couple of scrawny, struggling marijuana plants that someone had obviously planted but not tended. The focus of the groups activities then moved to how to successfully transplant these little treasures. Attempts to re-focus the participants were unsuccessful.

- The teaching approach was to use the environment to develop the skills of information gathering, problem solving and communication. This also involved initiative, at the mention of which members of one group felt this had been discouraged in certain situations they had been in. The six steps to customer service which three participants knew well from their employment at a fast food chain, was mentioned as initiative destroying. This prescribes the exact steps to be taken in serving a customer, starting with a smiled greeting and finishing with 'thanks, come again'. Any deviation from these steps was, apparently, positively discouraged.

- Findings from the interview process show the majority of participants had a strong affinity with local rivers and waterfalls as part of the natural environment. This was presented to each of the groups along with other information and proved to be a good starting point for various aspects of the learning and teaching. Participants from both groups appreciated the use of this information in planning activities. It was a clear indication that their views were important, and that the teacher was interested in them.

- Intolerance, often manifested as racism, sexism or homophobia was common - not forgetting LEAP, in the context of this study was dominated by young Anglo-saxon males. Expressions of anger towards minorities such as Asians were widespread. Disagreement towards the governments immigration policies were evident, however, participants in one group felt they were unable to express their disagreement with the government. Their only opportunity was to take out their anger on Asians directly.

- Discussion with one group considered the broadcasting of the Sydney Gay and Lesbian Mardi Gras, which had been on television during that week. The majority of participants felt that such an event should be banned, and if it was not, then it should certainly not be shown on television, where children may see it.

## CONCLUSIONS

These conclusions relate to the research problem which evolved as;

> "whether critical thinking and action learning can enhance self-concept and environmental education for unemployed young people."

Observations (which were made during the learning and teaching), reflections (which were made after the learning and teaching) and the various inquiries which have resulted, provided many valuable insights into the groups, the individual participants and to myself as a participatory co-learner. These insights strongly support a positive response to the question within certain limitations and circumstances; in other words, a whole-hearted, but qualified 'Yes'.

**Environmental attitudes, knowledge and actions of LEAP participants**

The findings from the questionnaire survey revealed that 86% of participants had a good attitude towards the environment, 56% had a good level of knowledge about the environment and 34% had good actions towards the environment.

The results of the questionnaire were used effectively with participants in a number of ways. Participants recognised that the information was based on them which had the effect of personalising the learning. The lower levels of environmental action, compared to knowledge and attitude, also demonstrated the need for learning about actions that could be taken.

**Approaches to environmental education and learning for LEAP participants.**

The most appropriate approaches require a mix of learning techniques, depending on the circumstances of the individual and the group. Self-directed and learner-centred techniques were appropriate. Starting where the learner is, which includes the use of the questionnaire results and information from the individual interviews was most valuable.

Education *for* the environment is particularly valuable where it complements the two more common components of environmental education - *in* and *about*. Participants were noted to respond well to the opportunity to discover the economic, social and political context of various environmental issues.

**The impacts of unemployment, peer pressure and mass culture**

- Unemployment – may affect emotional health where it manifests itself in social and psychological problems. The length of unemployment, age at which a person becomes unemployed and economic deprivation are all important factors.
- Peer Pressure – commonly manifests itself as impulsive, uncritical, 'follow-the-leader' behaviour. It is heavily influenced by the media and consumerism, and encourages uniformity in fashion, entertainment, outlook and thinking.
- Mass culture – is an insidious and hegemonic effect which impacts constantly on people. It is almost a form of thought control, and may be seen as the antithesis of environmental sustainability (Eckersley, 1995).

Participants were often resentful when forced into training which has an element of social control. Other pervasive influences such as family backgrounds, decreasing work opportunities, drug and alcohol abuse, trouble with the police and self concept also have an impact. In many individuals the combination of these factors presents as a downward spiral.

**The integration of action learning and critical thinking strategies into the learning and teaching.**

This involved the identification, by groups themselves, of areas of interest for increased understanding. Commonly these were local issues and their subsequent investigation was associated with field trips, outdoor activities, guest speakers and role plays. This provided immediate benefit as participants demonstrated enhancement of, and influence over, their own learning.

Benefits of this approach, which included planning an activity, doing it, and reflecting on it, were acknowledged by the group(s), although sometimes this approach was seen as difficult, time-consuming and plain hard work. The level of commitment to this approach was not always high.

**The individual participants life history, and prior knowledge and experience of environmental issues.**

The individual circumstances of participants often have a profound impact on their receptiveness to the LEAP program, and also greatly influence the approach to learning and teaching which has evolved in this study. The following extract from my journal, which describes the circumstances of one participant, encapsulates these issues well;

> Melinda turned 21 near the end of her LEAP course. She lives with her boyfriend who is unemployed and who had recently spent time in detox (a drug and alcohol dependents' unit). Her father died in jail and she is alienated from her mother. For recreation she enjoys night life, getting drunk and stoned. She previously had a job working in horse stables which she enjoyed, but left after being physically assaulted by her boss when she complained about her pay. Melinda thought a job in retail might be good. There she could join a union for protection.

The main points from the interviews which effected the approach taken to the learning and teaching are summarised below.

- participants dissatisfaction with their home situation – which was widespread
- lengthy periods of unemployment – these were common
- drop out rate from school and other courses started since leaving school – this was high
- dislike of authority at school – very common
- information about current affairs and 'news' issues came from television 'info-tainment' style programs – notable for their shallow analysis of issues and reinforcement of stereotypes
- all participants had some 'special' places in the natural environment

## RECOMMENDATIONS

A number of recommendations arising from the research are made. Some of these are not new, in that they represent commonsense knowledge in the areas of teaching with unemployed (young) people in LMPs. Some of these points were referred to in a LEAP review (DEET, 1994). It is obvious however, that they are easily overlooked during the planning and commencement of projects, which in my experience, is often done in a rush. They therefore need to be restated here.

1) Supervisors and teachers should be experienced and interested in working with unemployed young people. These people also need support and professional development services.
2) To achieve the LEAP program goals, project work should provide 'real-life' work experience, be meaningful and relevant, as well as have obvious community and/or environmental benefit.
3) Both the project work and the formal training should be well integrated.
4) Participants should be involved in some aspects of planning the project work.

The one major recommendation specific to the research is that, where appropriate, integrated critical thinking and action learning strategies be incorporated into other aspects of both the training and the project work in LEAP. This recommendation has implications for the self-concept and emancipation of participants, the contribution of LEAP to environmental education and the educational approaches which the research supports.

### Self-concept and emancipation

The provision of vocational training and experience to improve long term employment prospects of unemployed young people is the primary goal of LEAP. This research has been about learning and teaching with the same unemployed young people. There is an immediate tension here. The training and education available to young people is becoming increasingly vocational in nature, leading people towards full-time employment at a time when such opportunities are decreasing amid the casualisation of the labour market.

There are a huge range of issues beyond unemployment which affect the lives of many LEAP participants. These include economic constraints, trouble with the police, drug and alcohol abuse. Associated with these issues are alienation, apathy and uncertainty over their role in society. The approach taken in the learning and teaching, which this research supports, has benefits which can go a long way towards overcoming the issues - towards the emancipation and increased self-concept of participants.

### LEAP's contribution to environmental education

The secondary goal of LEAP is to provide the opportunity for participation in an environmental or conservation project. LEAPs contribution to environmental education is certainly limited, in another apparent tension. This is largely based on the curriculum, which concentrates on cognitive objectives - education *in* and *about* the environment are well catered for - and does not start where the learner is.

The approach taken to the learning and teaching in this research was to commence where the learners were and provide participant involvement and shared control in planning and assessment. Values were identified and clarified and the 'real-life' social, economic and political context of environmental issues were uncovered in education *for* the environment.

### Educational approaches: a conclusion

Critical thinking and action learning evolved to become integral to the learning and teaching in Conservation Concepts. They have the potential to improve course and project outcomes, and the environmental education and self-concept of the participants. How participants learn is equally as important to what they learn. Attending to how participants learn includes the need for support, time and learner control. These are well catered for in the action learning approach which is accessible to the wide range of different abilities, interests and enthusiasms commonly found in a LEAP group.

Action learning is both practical and emancipatory. It can be used to identify the social context and dominant influences over peoples lives. Action learning and critical thinking approaches were not regularly encountered by participants elsewhere in LEAP training or project work. These approaches were sometimes unwelcome and rejected, because they were unfamiliar.

Critical thinking and action learning should be thought of as the most practical activity that LEAP participants (and anyone else) can undertake. This requires a change in the way project coordinators, teachers and supervisors look at the world and the place of LEAP in it. This does not have to mean a reduction in vocational education and training as there are numerous areas where it is appropriate, but it does mean adopting a broader goal for learning and teaching. It means enhancing the status of thinking. 'Hands on' must equal 'heads on'.

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# For a Common Cause: Case Studies in Communities and Environmental Change

**Graeme Gibson and Meg Bishop**
**Community and Environmental Education Consultants**
**67 Bonython Street Downer ACT 2602**

## SUMMARY

It is often said that there are no environmental problems, just lots of social, economic and political problems which affect the environment. *For a Common Cause* is a collection of 22 case studies about different communities – local and regional, urban and rural – and the roles they have played in effecting positive environmental change. *Environment* is not just nature and natural systems; it includes people and the range of social, economic and political systems that people have created. *Positive* environmental change includes environmental restoration, increased community awareness, improved planning and better understanding between community and government. Jobs, health and education are all issues strongly linked to a community's environment, and case studies in these areas show how a community overcomes obstacles and setbacks to achieve change, and how it maintains momentum following both success and failure. All of the case studies have been written by representatives of the communities and each focuses on the process of change as much as the outcomes.

## INTRODUCTION

The idea for this book came from our longstanding interests in how community groups function, fuelled by various experiences, observations and memberships with a range of community groups over many years. Employment with non-government and government agencies, working closely with many different groups, has also provided greater exposure and contact than might otherwise have been possible.

When submissions were first sought from a wide range of community groups, it was expected that conservation and environmental interests would predominate, but we were also keen to attract submissions from groups whose main focus was on related issues. Jobs, health and education were areas that came to mind, for these are all strongly linked with the environment. We believe we have managed to achieve this broad focus. In all, over 70 enquiries were received and almost 40 expressions of interest.

Initially, we were interested in case studies of *community* inspired and managed change, but it soon became apparent that there was a good case for considering examples of *government* initiated projects which have been able to inspire and manage in partnership with the community. In the 1990s there is no doubt that governments have a responsibility to support community participation in sustainable environmental management and it seemed appropriate to recognise this.

The case studies are not intended to represent the best, or most successful examples of community action. It was not part of the brief for contributors that the case studies should provide solutions. They are not just descriptions of the warm and fuzzy outcomes of successful community group action. A highlight of these case studies is that they provide a focus on the *process of change* as much as the outcomes.

This includes how the community has overcome obstacles and setbacks to achieve change, and how the community has maintained momentum or evolved over time. This process is often slow and needs a concerted effort. It may result from the efforts of just a few key people who have been the mainstays of a group. Many projects have changed their focus over the years - sometimes broadening, sometimes narrowing. Sometimes community groups form for a purpose, attend to that purpose (not always successfully) and then disband.

These case studies were chosen to represent diversity in purpose and function. Some groups were immediately successful, others faced ongoing obstacles which must surely have tested their resolve. The communities vary greatly - they are both local and regional, urban and rural. The projects these communities are concerned with also vary - some are multi-faceted, some narrow. Some projects are old, some have a relatively new focus.

After the case studies there is a discussion on the community and government in a review of how and why change happens. This includes some features and significant examples of change in Australia, much of which is reflected in the case studies.

All of the case studies have been written by representatives of the communities and necessarily illustrate their views. Some of them reveal an amazing degree of openness, honesty and willingness to share. Contact details for each group are provided should readers wish to seek further information. To assist in reading and appraising the case studies, we have provided various focus questions on what makes groups work and on the process of change. The Conclusion draws on aspects of the case studies and reflects on these questions.

- How important is early and/or on-going success to a group?
- How clear is the link between the social, the economic, the political and the environment?
- Can a group work without a formal structure?
- How difficult is it for a group to overcome institutional resistance to change?
- How important is ownership of the process and how evenly distributed has this been throughout the group?
- What does it take for individuals to become involved in community group action?

"Change enough of the little pictures and
you find the big picture has changed".
Ashleigh Brilliant

## THE COMMUNITY AND CHANGE

> "Never doubt that a small group of thoughtful, committed citizens
> can change the world. Indeed it's the only thing that ever has".
> Margaret Mead

Put quite simply, a community is a group of people who share values and institutions. The Concise Macquarie Dictionary puts it a little more precisely as, "a social group of any size whose members reside in a specific locality, share government, and have a cultural and historical heritage". The term community has all sorts of subjective, often warm and fuzzy connotations, particularly when referred to by politicians and others seeking its support.

For most of human history, the community has been the source of people's values, and has been central to survival. It was undoubtedly the best thing going, but with the arrival of the industrial revolution, things changed - the community declined as people no longer depended on each other. Decision making has gone to large central bodies and the powerful in society, as big impersonal cities replace villages and towns.

Perhaps this decline of community still happens in Australia (and many other countries), with widespread political apathy and alienation and a general population drift to urban areas. There are some notable exceptions which defy this trend, such as the movement of some Australian Aboriginal communities back to traditional lands, along with the alternative cultures which have been present, at least since the 1960s.

It seems, however, that in terms of environmental issues, the role of the community is increasing in recent years, but in a different form to earlier times. Environmental management and change, for example, is widely seen as needing a partnership of government and community. Neither the community-led 'bottom up' approach, nor the government-led 'top down' approach, is likely to be successful over the long term. Although the extent of environmental problems continues to grow, an increasing number of people understand the nature of the problems and respect the interconnectedness of environmental and social systems. These people want action, and to be involved and to share responsibility. The contribution of the community to natural resource management programs like Landcare, One Billion Trees and Save the Bush has been enormous. These provide a vivid illustration of successful involvement and responsibility.

### How change happens

Sometimes some people will believe there is a need to challenge the conventional wisdom, or the dominant behaviour in a society. On these occasions they often require a good deal of courage, innovation and persistence in the face of opposition from the majority or from vested interests. Time, and lots of it, may be the major requirement.

There seem to be common stages which any good, but radical new idea follows, before finally making it.

**ridicule** - you can't do that
- it won't work
- you're crazy

**discussion** - well maybe
- just imagine
- but what if

**acceptance** - see how good it is now
- aren't we clever
- why didn't we think of it before

### Government change and the community

Governments can influence change through the use of education (eg. health promotion, recycling and water use campaigns), by legislation (eg. compulsory wearing of seat belts, banning smoking in work places) or, as advocated by many, a combination of both. Education and encouragement are often more palatable to governments than legislation, and the matter of enforcement of legislation is another thing again. An example of this is the 15 per cent cut in domestic water consumption achieved through a public education and information program in the ACT. Other areas have managed significantly lower cuts in water consumption when relying solely on regulatory approaches.

Government legislative policy concerning natural resources has also changed markedly from a stance favouring exploitation to one favouring conservation over the last few decades.

In some cases public concern over environmental issues, which has grown considerably since the early 1960s, has led government policy and programs. In other cases government policy has led public concern. Factors which have contributed to the rise in public awareness include;

- the landmark publication of Rachel Carson's *Silent Spring* in the early 1960s warning of impending ecological calamity in US agriculture;
- the visible and undeniable impact of air and water pollution, particularly in the northern hemisphere;
- the rise and influence of many influential and popular conservation groups;
- the popularity of TV documentaries and the support of prominent citizens for environmental issues;
- the frequent occurrence of major development versus conservation issues, commonly portrayed as a choice between jobs or the environment;
- the occurrence of catastrophic disasters, eg. oil spills and nuclear accidents, which have all the requirements for sensational media coverage (speed at which it happens, a perpetrator, a victim and graphic images).

Governments, at all levels, have responded to public concern over environmental issues and community demand for participation in environmental management by providing support for communities - support that has included resources, training, facilitation and recognition. This has created problems for the bureaucracy, where local democracy and participatory planning can sometimes be real nightmares. Critics of the approach see it as government failing to act decisively, or using the community as a delaying tactic.

**Community change and the government**

In 1986 conservation and environment group membership throughout Australia was estimated at 500,000. By 1992 this figure had increased to 715,000 - about 1 in 25 people. This includes membership of the large national groups (Australian Conservation Foundation, The Wilderness Society, Greenpeace etc.) along with the smaller 'Friends of the Patch of Bush Down by the Local Creek' type of group. Although the last few years have seen a decline in membership after the peak of the early 1990s, these figures have long been influential in the political process.

1988 saw a remarkable alliance of two groups who had not always been friends, and in fact were from the opposite ends of the political spectrum. Their 'disagreement' had been less visible than the conflict the media has focussed on between forestry or mining developers and the environment lobby. This alliance was between the National Farmers Federation and the Australian Conservation Foundation, who both agreed that land degradation was Australia's most serious environmental problem. Their joint submission to the Federal Government led to the establishment of the National Landcare Program, with funding of $340 million over the 1990s.

Landcare has been considered by many to be a great success story. Since its inception more than 2,000 Landcare groups have formed and this number is still growing. Although representing only about 30 per cent of farmers in Australia, this is still a very high rate of voluntary membership. The Australian model of Landcare has also been of much interest to other countries considering community management of natural resources. But recently concern has been raised, that although Landcare programs have been effective in raising awareness of land degradation and facilitating planning, they may not be achieving much in the way of on-ground improvement.

In 1994 the NSW Government released the results of research which showed that the community believed that the environment was the fifth most important issue for the (NSW) state government to be concerned with. The top 4 issues ahead of environment were unemployment, education, health and crime. When asked to nominate the top issues the community believed the state government should be concerned with in ten years time, the same issues occupied the top five spots. But environment had moved up from being the fifth most important issue, to be the number one most important issue. This appears to indicate that people are pessimistic about the state of the environment - they think the problems will get worse.

## CONCLUSION

Although there is a wide range of useful information and resources for community action, a do-it-yourself prescriptive guide for all groups to follow does not exist. And neither did this book attempt to provide solutions - we were as interested in the process of change as in the warm and fuzzy outcomes. We believe that these case studies have shown a range of actions, models and processes. Perhaps considering the questions posed in the Introduction has provided greater insights. In closing, here are some thoughts on those questions.

- How important is early and/or on-going success to the group?

For most groups this seems to be quite important, particularly those groups which are entirely voluntary. The case of TREAT, who started in 1982 and were immediately successful planting trees on the Atherton Tableland is pertinent. What might have happened if their first few years tree planting's were devastated by drought or insect attack and all their hard work had come to little? CHOKE in South Australia were not immediately successful in their goal of being taken seriously, but it seems that what they saw as the seriousness of the situation, perhaps combined with some strong support, sustained them. Port Sorell Landcare group were far from successful in raising awareness leading to action over their problem. They were, and still are, subject to the 'Out of sight - Out of mind' response from much of the community. But Government agencies have responded well.

- How clear is the link between the social, the economic, the political and the environment?

Often this is quite unmistakable, such as in the Mitchell River Watershed Management Group. The whole range of land users became involved - Aboriginal communities, pastoralists, conservationists and resource industries - all with different individual goals and agendas but all talking to each other. And the Conservation Council of South Australia took a proactive political approach to the issues of development and conservation. But in other instances the links are less apparent. For example the link between Successful Aging and a healthy, natural, urban environment. *Environment* truly is about people and their social, economic and political systems - along with nature and natural systems.

- Can a group work without a formal structure?

Probably not, but there is a wide range in the nature of the formality. Openness and understanding of the group's structure and functioning seem to be all important.

Surfrider Foundation endeavoured to establish some sort of formal structure for their members interested in taking action, but the members didn't want this. It seems they wanted to know what was happening and to have the opportunity of becoming actively involved, but they wanted to trust the main organisers. NatureSearch 2001 seems to have a fairly direct and formalised structure, with a pyramid type hierarchy typical of governments. And it seems that it works very well for them. Rainbow Power Company is towards the other end of the spectrum. Wages are equal and participation in decision making is encouraged. And this seems to work very well for them.

- How difficult is it for the group to overcome institutional resistance to change?

It seems that this is often quite a major problem. Majority views and vested interests carry a lot of weight in our society. Revolve lacked a concrete model to use as an example. It was just an idea during six years of negotiations with government and industry, who didn't believe that it would work. They were successful because they didn't give up. Urban Ecology identified conventional land developers and local government as their main obstacles. It seems that ultimately they were successful because of the strength of their argument and the amount of support they attracted.

- How important is ownership of the process and how evenly distributed has this been throughout each group?

When people become involved in planning and decision making this has the effect of de-mystifying the process and empowering them. The project at Laverton Creek is as much a process of attending to people's social needs and personal values as it is a process of restoring a creek. The success of Doutta Galla Community Health Service's projects owe much to good planning and continuity of team members.

The depth of an individuals' learning has been said to be dependent more on their control of the learning situation than on their intelligence. It's probably similar with action and involvement - with change. The most important thing is the amount of control and ownership people are able to have.

- What does it take for individuals or a community, to become involved in group action?

At the individual level, involvement in action and change depends on certain characteristics - people's values and attitudes (seen in the strongly committed members of Nursing The Environment), awareness, understanding and skills (seen in the Hawkesbury River Centre) and their lifestyle expectations (seen in Serpentine-Jarrahdale Ratepayers and Residents Association). These characteristics can in turn be influenced by the government, media, education, employment and the cultural context of the community. The 'cultural context' of the Gulf Barramundi Restocking Association, for example, probably means that ensuring the economic viability of the industry is seen as more important than restoring the ecological integrity of the waterways.

At a community level, the factors behind empowerment, management and change include a sense of community and attachment to place (of belonging and wanting to contribute), local knowledge, and cohesive relationships within the community. The memberships of Gerroa Environmental Protection Society and the Community Environment Program of the Aranda Primary Schools represent good examples of these factors.

People who are involved in community group action and change tend to be better educated, better paid, articulate and politically aware. Political apathy and alienation are widespread throughout the community and often accompanied by a belief that the individual can do little. Threatened or worried people will usually resist change, so understanding and awareness are important. Change is often scary and needs to be taken at a pace that people are comfortable with, but not so comfortable that nothing happens!

# Waterwatch Australia
# (Environmental Education for the Whole Community)

**K. Gowland[1], D. J. Foster[2],**
**1. Environment Australia, National Waterwatch Facilitator, ACT.**
**2. Queensland Department of Primary Industries, Extension Specialist, Nambour, Qld.**

***Abstract***
This paper describes the developmental philosophies and current operational structures and support behind the Waterwatch Australia program. It identifies issues associated with changes in the needs of contemporary natural resource management and the role of the community, including schools, within communities in these new paradigms.

***Keywords***; waterwatch, water quality monitoring, catchment, water quality, community participation, ecology, natural resource management, ecologically sustainable development, monitoring, curriculum, environmental education, landcare.

## Introduction

With rapid changes to Government policy associated with resource management and the principles of ecologically sustainable development (ESD) there is a growing need for more extensive research, environmental monitoring, the establishment of conservation strategies and involvement in community participation to resolve environmental issues. This paper offers one possible solution to these problems - a well researched and structured program for community involvement in resource management - Waterwatch Australia.

The Rio Conference and Australia's subsequent signature to the resolutions of that conference has put greater responsibility on governments at all levels to consult and work with communities to resolve issues of ESD. People of Australia are now demanding greater involvement in decision making and are expecting greater accountability of decision makers at all levels of our political and governmental systems. This program provides a participative approach which is experiential in nature, collaborative in approach, actionable in outcome and involves the whole community.

The objectives of Waterwatch Australia are outlined in the national 'Strategy and Action Plan'. National coordination is through the Commonwealth Department, Environment Australia. Environment Australia chairs a national steering committee made up of state facilitators and invited representatives from the Commonwealth Environmental Protection Agency, the Murray Darling Basin Commission and has other consultants as required. The main function of this national steering committee is to resolve issues of comparability between state programs, achieve consensus about national strategies and events and to develop common protocols for data collection and management.

Within each state there is a state steering committee consisting of the state Waterwatch facilitator, state and local government representatives and community representatives. The role of the state steering committee is to facilitate the implementation of Waterwatch in the state and to develop state policies. Within the States, regional Waterwatch networks collaborate with Integreated Catchment Management committees, Landcrea Councils, local and State Governments and other organisations. There is also a major thrust for the establishment of Waterwatch within the formal education systems with a structured approach operating between the Department of Education and the DPI.

**Aims of Waterwatch**

Waterwatch is a community education program which focuses on understanding and resolving water related issues within a catchment. The guiding principals of the Waterwatch Australia program are to:

* develop community awareness and 'ownership' of water quality and environmental problems;

* as a result of this awareness and 'ownership', encourage and assist communities to take remedial actions in partnership with natural resource management agencies and local government and. in so doing, to gain better understanding of the connections in ecosystems and the concept of wise use of natural resources;

* further enhance the role of local government in environment conservation;

* provide links between existing programs, communities within rural and urban catchments and across the country to enable exchange of information and ideas;

* develop a national network of monitoring stations using accepted guidelines and standards where possible;

* encourage community involvement with related natural resource management programs, such as the Save the Bush and One Billion Trees programs (and other components of the National Landcare Program), and the Endangered Species program; and

* facilitate the development of school curriculum material relating to the natural environment.

**Fundamental Principles of Operation.**

Waterwatch Australia operates within Australian communities in both andragogical and pedagogical settings. The fundamental principles which permeate both settings are contemporary participative methodologies of extension, action research methodologies and multidiscipline approaches.

**Contemporary Participative Methodologies of Extension.**

Extension: *Processes to achieve positive outcomes for people, communities and situations.* There are a number of extension models and Jiggins (1993) describes six models ranging from a linear 'transfer of technology' approach to more recent 'participative' models like 'natural resource management'. Chamala (1995) outlines the Participative Action Management (PAM) model which reflects the participative involvement of all stake holders in decision making and subsequent action outcomes and outputs associated with those decisions. Participation should be distinguished from 'consultation' when designing extension services. Participation in the context of extension can be defined as; *on-going involvement in decisions about content and process*.

**Action Research Methodologies.**

Waterwatch Australia encourages the application of 'participative' extension processes to embrace the principles of 'action learning' thus providing an action outcome which involves action *for* the environment. Throughout Australia Waterwatch groups tackle issues with various interpretations of the action research model. The basic Plan-Act-Evaluate-Generalise cycle has refinements which manifest as variations based upon the settings and the needs of specific communities.

### Multidiscipline Approaches.

Long gone are the days when environmental activity is seen as the sole responsibility of the natural sciences. Multidisciplinary approaches are seen as essential to allow the complete sociological richness which contributes to the impact that humans are having on the environment. 'Participatory' methodologies in fact demand this approach because to involve the whole community (including current, past and future generational representation) is to embrace all the disciplines of the human condition.

### Andragogical Environmental Education Processes

Waterwatch Australia outlines social processes for community problem solving. Based upon the work of extension specialists such as Chamala and Mortiss in 'Working Together For Landcare' (1990), which outlines a Participative Action Management Model, Waterwatch Australia offers a sound community process for issues identification and resolution. These processes are housed in National and State publications such as the series of information pamphlets designed to outline the protocols for Waterwatch participants throughout Australia and 'Waterwatch Queensland Community Handbook'. A deliberate strategy of (wherever appropriate) linking the Waterwatch Australia implementation into existing Government initiatives such as ICM/TCM and Landcare, has been established to ensure that the material is relevant, actionable and that there is minimal duplication of effort or resources in the implementation of the material. Waterwatch Australia has application to all community settings and is being used throughout Australia by individuals and community groups to monitor their own progress towards ecological sustainability, contribute to catchment data bases, work with industry, enhance educational programs and aid Local and State Government monitoring programs.

Waterwatch Australia material, wherever it is designed, upholds the principles of adult learning and allows participants to build upon their existing knowledge of waterbodies, apply it to their local situations, enjoy their experiences with successes and allows communication between Waterwatchers and information contributors to take place throughout the learning experience. By involving adults in this way, greater knowledge and perhaps wisdom results, empowerment and social responsibility is engendered and combined resources are mobilised to work for the environment.

'Participatory research [is] defined as a research process in which the community participates in the analysis of its own reality in order to promote a social transformation for the benefit of the participants, who are the oppressed. It is therefore a research, educational and action orientated activity' (Dubell, 1980, P70).

Kelly (1995) lists nine characteristics of suitable conditions for participatory research:

1. The main beneficiaries will be the people of the community.
2. The community has the authority to define and analyse the research task.
3. The research originates within the community.
4. The research topic is complex, allowing multiple possibilities.
5. The community wants action and commitment rather than detachment and objectivity.
6. The research task requires attitudinal as well as structural change ("The participatory nature of participatory research organically links the research to the 'whole' system of the community and so minimises panic about resistance to unintended consequences" (Kelly 1995 P96)).

7. The research task requires full and active participation of people for the entire research process.
8. There are under-utilised skills and resources in the community.
9. There is a reasonable amount of time available.

Waterwatch Australia can meet most or all of these characteristics; and hence participatory (action) research is likely to be a very effective platform for adult learning leading to integrated catchment decision making.

**Pedagogical Environmental Education Processes**

Students form a key segment of community on this participatory research. They are much more than a valuable volunteer workforce who at the same time gain both life and curriculum learning: they are to be seen as part of the community of responsible persons, able to contribute to the decisions and actions affecting the environment for which they will one day have greater responsibility (Ewing 1995). Participating in research into the real catchment management issues surrounding them enables students to experience an education that embodies some of the key common and agreed national goals for schooling in Australia (as ratified by the Australian Education Council, Hobart, 1989) including:

- appreciation, understanding, concern for balanced developed and global environment; and judgement in morality, ethics and social justice
- skills of analysis, problem solving, information processing and computing
- knowledge, skills, attitudes which enable students to participate as active and informed citizens.

Waterwatch fits into several sections of the National curriculum framework and provides opportunities for teachers to attach 'learning for life' ethics to their teaching strategies. Recent initiatives in the Studies of Society and the Environment, Science and Technology curricula have allowed Waterwatch to act as a vehicle for process and content applications to these curriculum areas.

Primary and secondary schools throughout Australia have locally developed activity based resource publications which investigate the properties of water, catchment geomorphology, catchment history, water quality and many other catchment systems and Waterwatch provides opportunities to do this in a multidisciplinary context. Literature, art, social science, drama, and technology play key roles in the learning by students. Action research is used as an underpinning foundation for the development of these resources and thus provides 'understanding by involvement' for students as well as providing the opportunity for students to take responsible action in their local communities.

Waterwatch is also being used at Universities and TAFE colleges. For example, in Queensland, Griffith University has a component of Waterwatch built into its Masters of Environmental Education program through the Landcare education vacation course and Grovely, Ithaca, Southbank and Cooloola colleges of TAFE have included Waterwatch in courses associated with resource management and environmental science and in some cases have also run inservice programs for lecturers.

Waterwatch Australia also has a national and an international telecommunication capacity which can allow students to become involved in the latest technology and to establish cross cultural links within Australia or across the world.

Thus Waterwatch Australia can provide a multidisciplinary environmental education vehicle for teachers and other environmental educators and has the benefits of a wide range of coordinated material and support processes. Waterwatch Australia can make life easier for teachers and more rewarding for students.

**Case Studies**

In the Australian Capital Territory there is the 'Lake Tuggeranong Lakewatch' program which has been designed by the local community to teach students to be environmentally responsible and aware and at the same time create an ethos of ownership for the lake and the surrounding community. It incorporates both adult activity and school learning.

6,000 kilometres away in the pristine north east of the Northern Territory is an isolated town called Gove. Gove is a mining town mining bauxite to make aluminium. This activity is a major concern for the 1000 Yolngu aboriginal people of the area. Dhimurru, an organisation which represents these people, has initiated Gove Waterwatch to provide independent information on the local water quality.

In the largest city in Australia, Sydney, the Sydney Waterboard, has initiated a major campaign called Streamwatch to highlight the need to look after the quality of water courses and catchments in the Sydney area. Targeting pollution in creeks through schools' the campaign extended also to community groups. This program has been so successful that it now extends, through the state government Department of Land and Water Conservation, throughout the state.
All of these are examples of how Waterwatch is embracing many aspects of community needs and respects the need for communities to use the program for those needs. Waterwatch Australia respects the need for diversity of programs across the nation.

In Queensland schools geography classes are studying the effects of agriculture on local streams, looking at the condition of the riparian vegetation on their local urban streams and becoming involved in local planning issues. Queensland students, from preschool to year 12, are involved in similar school activities associated with science, social science and geography through Waterwatch Queensland education resources.

On the south-west coast of Western Australia algal blooms in the estuary of the Peel-Harvey catchment were creating serious concerns. By using a community based water quality monitoring program called 'Ribbons of Blue' and involving nineteen of the twenty one schools in the catchment, phosphorus loads coming from the catchment were highlighted and management practices were initiated.

In the Latrobe Valley in Victoria farmer Adrian Wells had often wondered whether farming or forestry was responsible for the high levels of turbidity in the creek that flowed through his property. When local Waterwatch coordinator Noel Morgan gave him a turbidity tube Adrian was able to trace the problem to its source. Sure landslips on the farms contributed but the major sources were logging roads and forestry operations.

In a small coastal Queensland catchment the Maroochy River Catchment Area Network has worked for many years to establish an issues resolution process based upon the Waterwatch program. After three years of monitoring and bringing people in the catchment together the group has begun to provide a service to the community which allows for the resolution of catchment management problems.

Mansfield High School geography students have been monitoring local water quality since 1992, when they participated in a Murray-Darling Basin pilot program. The Murray-Darling Basin is one of the largest catchments in Australia and extends over four of the seven states. By accessing electronic communication systems the students were able to monitoring results from throughout the huge catchment.

In Goulburn, Victoria Waterwatch volunteer monitors for Landcrea groups, other community groups and schools are contributing to a nutirent management program through regular monitoring of irrigation drains. The data of this particular catchment network is used by consultants, working for the State Government, in their relevant projects.

**Conclusion**

Australia is big country. It has catchments that encompass deserts, mountains, tropical and temperate rainforests and wetlands, prime agricultural lands and large cities. The condition of these catchments varies from natural pristine through mildly impacted by surrounding human activity to being highly modified and polluted. What a task then, in a country so vast and diverse as Australia, to try to preserve the pristine, manage the impacts and reclaim the polluted.

The very exciting aspect of Waterwatch Australia is the true community nature of the program which has lead to the rich diversity of activities linked under the Waterwatch umbrella. Inherent in the strategically developed network is strong community representation at all levels and across the nation.

Ultimately we can only protect Australia's natural environment if the whole community is involved in the management of our land and water. Understanding the complexities of human/nature interactions is fundamental to this involvement and Waterwatch Australia provides a premier environmental education program for all Australian communities to achieve these understandings and thus gain the wisdom needed for ecologically sustainable catchments.

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# Renewable Energy: Here Today And Here Tomorrow

**Alan T. Gray**
**Editor, *Earth Garden* magazine, and**
**author of *The Earth Garden Book of Alternative Energy***
**Trentham, Victoria**

## SUMMARY

There are compelling environmental reasons for Australia to embrace renewable energy systems, both at a household level, and through major grid installations of (for example) wind power. Australia has the technical, natural and intellectual resources to lead the world in the use of renewable energy sources, but is hampered by a lack of education about its potential, and a lack of political will by politicians.

The best way to educate Australians about renewable energy is through a range of methods which include: practical examples of working households, rather than 'whizz-bang' technical displays by research institutions; use of mass media to highlight innovative household use of alternative energy; greater use of visits to existing displays in State capital cities; books; and the compulsory installation of solar hot water units in all new dwellings.

## INTRODUCTION

According to the CSIRO Division of Coal and Energy Technology, Australia could cut its carbon dioxide emissions by 50 per cent in ten years by embracing clean and renewable energy sources, if it weren't for economic and political impediments (Spinks, 1996). Such impediments were those which faced Tasmanians fighting the proposed Gordon-below Franklin dam 20 years ago, and, speaking as an environmental activist, I am convinced that in the area of renewable energy use, Australia can win a similar victory.

The key to instilling the political and economic will in our politicians is in educating our public to *want* renewable energy. As surely as darkness follows sunshine, our politicians will follow (not lead) such public initiatives.

### Why cut $CO_2$ emissions?

We know why Greenhouse gases are bad for our environment and why people need educating about ways to reduce such emissions, but why is it particularly relevant to Australians? The reason is that by some estimates we are the worst *per capita* Greenhouse gas emitting nation in the Western world. In fact, recent United Nations and International Energy Agency data indicate that Australia's rate of Greenhouse gas emissions by the year 2000 will be the worst of any country in the OECD.

If we can't get our house in order, with the technical, natural and intellectual resources which Australia commands, then we have no moral right to lecture other countries about their environmental disasters. In 1995 our then-Prime Minister, Paul Keating, smacked of hypocrisy when telling the Solomon Islands to clean up their logging industry. This year we have been isolated by the international community for siding with Saudi Arabia and only two other countries in resisting binding agreements on Greenhouse gas reductions. Our embarrassing and unhealthy gas problem is highlighted in the graph at Figure 1.

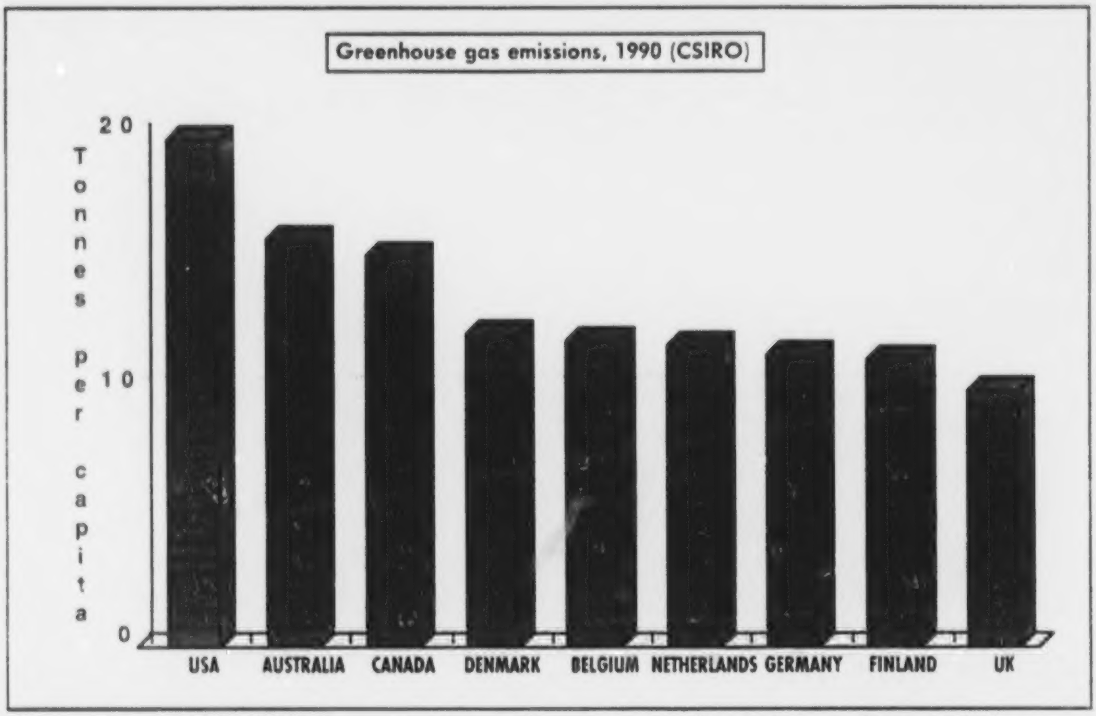

**Figure 1: a 1990 CSIRO comparison of *per capita* Greenhouse Gas emissions by OECD countries.**

A massive 93 per cent of NSW electricity, and 99 per cent of Victoria's electricity come from polluting coal power stations remote from the consumer. This system produces such extreme inefficiencies that only 4 per cent of the original energy is available to light an incandescent light globe by the time the power reaches the consumer (Anon, 1992).

**Percentage of energy lost when coal-fired power station lights an incandescent globe**

| | |
|---|---|
| Lost up chimney as coal is burnt | 64 |
| Transmission losses along power lines | 10 |
| Heat losses by 'burning' incandescent globe | 22 |
| | ------- |
| **Total losses** | **96** |

**Table 1: Energy losses from coal-fired power stations.**

### Current perceptions

All too often, as editor of a magazine which has been publishing articles about renewable energy since 1972, I hear uninformed opinions, such as: "Solar panels? Yeah . . . pie in the sky at the moment, but maybe the scientists will make it work in houses instead of space stations in another 10 or 20 years. And the panels are getting cheaper all the time."

Photovoltaic panels *are* getting cheaper all the time. In 1996 they cost $10 per watt, or around $820 for the state-of-the-art BP Solar or Solarex 83 watt modules. They were $10 per watt ten years ago too, so some people wonder why they haven't "dropped in price". They have — ten dollars took about 25 per cent longer to earn ten years ago than it does today.

Current perceptions are that solar energy is expensive, puny power; that it isn't 'strong' enough to run real appliances like power saws, ovens and fridges in the average all-consuming 'Starship Enterprise' home (drifting aimlessly through suburban life with all the lights left on). "Real men use 240 volts".

Another problem perception which requires correcting through education is that solar power is still very experimental, and only excites boffins in flimsy cars shaped like cockroaches flying down the Stuart Highway in the triennial World Solar Car Race.

A final misconception is that you must live in some idyllic valley, five hours drive from a city, with a mains grid connection quote of $30,000 to drive you to use renewable energy forms.

The facts are that solar is here and now, and thousands of readers of my magazine live in homes powered by the wind, a nearby creek, steam engines running on waste timber, or the sun. This includes people in Melbourne and Sydney, and many people on very low household budgets.

On the research front, through scientists like Professor Martin Green from the University of NSW Centre for Photovoltaic Devices and Systems, Australia holds the world record for the most efficient solar cells (currently around 24% efficient at converting sunlight into electricity).

## What sort of education?

So the gap is clear between the practical applications of renewable energy on one hand, and on the other the public perception and political will to embrace it. Our challenge is how to educate Australians to want to generate some or all of their power needs from some form of renewable energy.

In this regard we are lucky, because often renewable energy applications are interesting, and can be made relevant to people's daily lives. Rather than highlighting experimental installations from research institutions, the best way to educate people is to show them renewable energy in action, powering devices they recognise, in houses which look and feel like their own. I would love to see a suburban housing estate display home powered solely by the sun. This is not far off happening thanks to innovative examples like the Solar One house at Coolum in Queensland, which is solar-powered, but grid-connected, so it can feed excess solar power back into the mains grid.

There are many displays staffed by experts around Australia, and some of these, taken from *The Earth Garden Book of Alternative Energy*, are listed here.

## Energy information centres

Most States of Australia now run 'energy information centres' or 'offices of energy', which provide information about energy efficiency and alternative-energy systems for householders. The list below is also the contact list for display homes run under the Federal Department of Primary Industries and Energy's Renewable Energy Promotion Program (REPP).

New South Wales
Robert Brown, NSW Office of Energy, 29-57 Christie St, St Leonards, NSW, 2065,
Tel: (02) 9901 8764.

Northern Territory
Dr Subhash Chandra, Department of Mines & Energy, Centrepoint Building, Smith Street Mall,
Phone: (08) 8999 5511.

Queensland
Energy Information Centre, 61 Mary Street, Brisbane, 4000, tel: (07) 3234 9807.
Tel: toll free (008) 175 518, (07) 3234 9807.

South Australia
Mr Keith Plastow, Office of Energy, Tel: (08) 8226 5500.

Tasmania
Paul Turvey, Integrated Energy Management Centre, 163-169 Main Road, Moonah,
Tel: (03) 62733 355.

Victoria
Peter Zwack, CitiPower, 209 Stewart Street, Brunswick East, 3057, Tel: (03) 9389 4143.
Bruce McKenzie, Energy Victoria, Energy Information Centre, 115 Victoria Parade, Fitzroy, 3065, Tel: (03) 9412 6886.

Western Australia
Office of Energy, Floor 5, 170 St George Terrace, Perth, 6000, Tel: (09) 321 1477
Nigel Wilmot, Murdoch University Energy Research Institute, South Street, Murdoch, 6150, Tel: (09) 360 6330.

## Displays staffed by experts

New South Wales
Prospect Solar, 303 Windsor Road, Richmond, 2753, tel: (045) 770 577.
New Generation Technologies, 27-29 Sydney Road, Goulburn, tel: (048) 221 707.
Energy from Nature Home, 1 Alternative Way, Nimbin, 2480, tel: (066) 891 088.

Queensland
Energy Information Centre, 61 Mary Street, Brisbane, phone (07) 234 9807.
South East Queensland Electricity Board transportable building display based at SEQEB, Customer Technology Centre, Milton, 4064.

South Australia
Office of Energy mobile display caravan which visits State agricultural show days.
Tel: (08) 8226 5500.

Tasmania
Integrated Energy Management Centre, 163-169 Main Road, Moonah, 7009. Tel: (03) 6271 6461.

Victoria
Energy Victoria, Yarra Boulevard, Burnley, 3121. Tel: (03) 9412 6886 or toll free (1800) 136 322.

Western Australia
Energy Research Institute, Murdoch University, South St, Murdoch, 6150. Tel: (09) 360 6330.

## Industry associations

Solar Energy Industries Association of Australia Inc. National Office, 1st Floor, 505 St Kilda Road, Melbourne, Vic, 3004. Tel: (03) 9866 8977, Fax: (03) 9866 8922.

Renewable Energy Industries Association, PO Box 81, Melville, WA, 6156. Tel: (09) 330 2877, Fax: (09) 330 3278.

Apart from displays funded by governments and research institutions, there are also innovative and inspiring places like CERES (the Centre for Education and Research in Environmental Strategies) in the inner Melbourne suburb of Brunswick with interesting working displays of solar, wind and micro-hydro energy.

CERES brings renewable energy to life for students, and is an excellent example of the sort of education that can encourage young people to use alternative energy in later life. In fact, CERES receives 30,000 students and 20,000 other visitors each year. There's no reason that every State in Australia couldn't have a version of CERES, or a rundown house retrofitted for energy efficiency and renewable energy power generation.

I have visited the Centre for Alternative Technology at Machynlleth in Wales, and this quarry-cum-alternative-energy-park is another impressive example of educating the public about the domestic here-and-now applications of renewable energy.

The Tasmanian Government deserves praise for commissioning a wind farm on King Island to provide one-fifth of the power needs for the island's 1800 people. Tasmania is well-placed to embrace such renewable energy forms, and is starting to recognise this, now that the head of the Hydro Electric Commission is no longer the *de facto* Premier of the State. In fact, Denmark plans to provide 10 per cent of its power needs from wind by 2005, and the southern coast of Australia has a higher wind potential than Denmark.

An educated public can hasten the introduction of such alternative power generation, and displays mentioned above can be complemented by other means of education.

### Mass media promotion

Interesting renewable energy home power systems can be more widely promoted in the mass media. My family's steam engine was featured on the TV program *Healthy, Wealthy and Wise* two years ago, and more and more people should contact their newspapers, radio and TV stations about their home power systems.

Last year we installed solar hot water collectors to back up the hot water jacket in our slow combustion wood stove. We also installed a SOLATRAKA unit (which we call Star Track) with 4 X 75 watt photovoltaic panels on our roof. This electricity is fed into a 24 volt, deep cycle battery bank next to our steam engine, and means that as we add more and more PV panels as we can afford them, we will become less reliant on the steam engine. We have been connected to mains electricity for nearly ten years before switching to renewable energy, so our home system is partly for display and promotional purposes, and partly because of our personal concern about the use of coal as a polluting, fossil fuel source for Victoria's electricity. In preparing to switch to renewable energy, our household began some simple energy efficiency measures which are reflected in Figure 2 below, taken from the actual power consumption figures on our electricity bills over 15 months. Note the change from the September 1992 quarter to the September 1993 quarter (Gray, 1994).

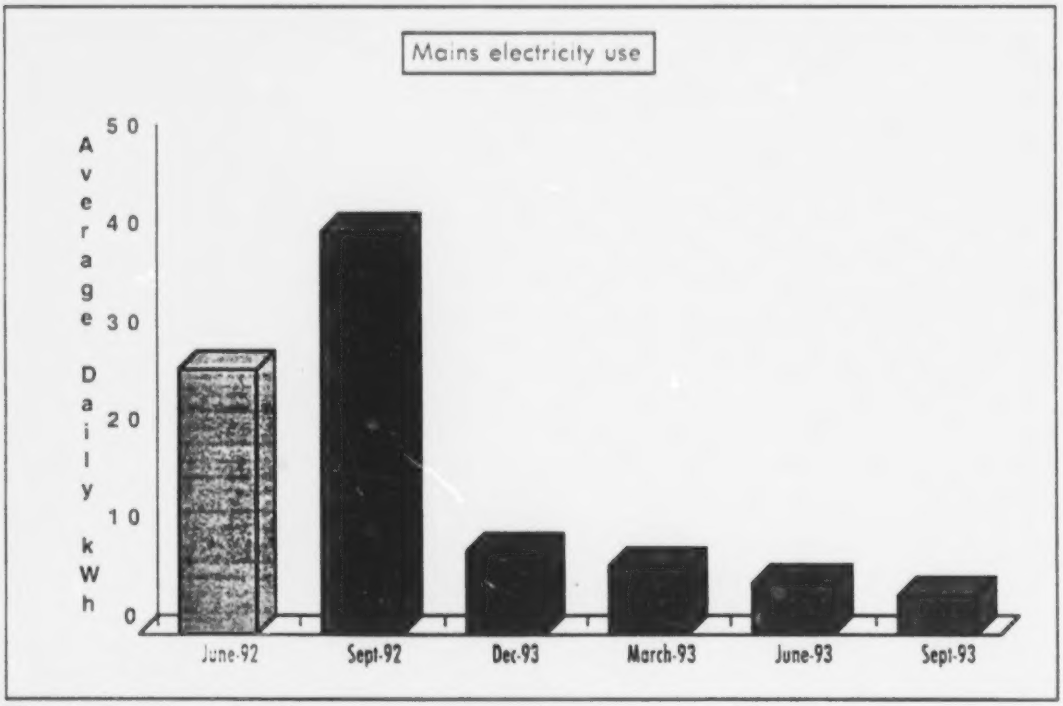

**Figure 2: Gray family power consumption drop over 15 months in preparation for switch to renewable energy power system.**

Our household, of two adults and two children, made the following changes in the lead-up to installing our steam engine and disconnecting from the grid: firstly we gradually replaced our incandescent light globes with energy-efficient compact fluorescent light globes; then we installed a reconditioned, slow-combustion wood stove for hot water and cooking; next we installed a 24 volt domestic pressure pump for our water supply; and finally we replaced our 40 year old electric fridge with a new CFC-free gas fridge.

One good example of promoting renewable energy through mass media impressed me on October 26 last year. Gary Davy of Davy Industries in Wodonga, Victoria, designs and manufactures the SOLATRAKA solar panel units which track the sun to maximise power generation. In summer this can increase the solar power generated from a typical array by up to 50 per cent. He held a simple Open Day at his solar-powered home near Wodonga. With one phone call to a local TV station he became the centre of a major weekend advertising promotion for the Monday night news bulletin which featured his home.

The 'angle' taken by the TV station was along the lines of: "A typical Aussie family battling rising power costs finds a way to do away with electricity bills forever. Find out how on Monday night's WIN TV news."

Another obvious way of educating Australians about renewable energy needs mentioning despite the risk of my being labelled a 'self-promoter'. There are few if any non-technical books about renewable energy available in Australia (which simply highlights the need for greater education), and I have just compiled one such text. *The Earth Garden Book of Alternative Energy* was published in November 1996, and is available from bookshops (Gray, 1996). I know of no other Australian books which aim to encourage Australians to embrace renewable energy in the city and the bush, whilst also giving detailed information about how to understand, cost and assemble such a system.

To appreciate how to be energy-efficient, and how to embrace alternative energy, people need to understand where their power comes from at the moment, and how they consume it. Too many people grow up happy to leave televisions running in empty rooms with lights on (like the abandoned ship, the Marie Celeste), and digital time read-outs on every conceivable appliance. This horrifies the average *Earth Garden* solar-powered householder, because such waste means one simple thing to them: flat batteries. Figure 3 below shows the breakdown of energy use in the 'average' Australian household, with obvious areas for energy efficiency (Gray, 1996).

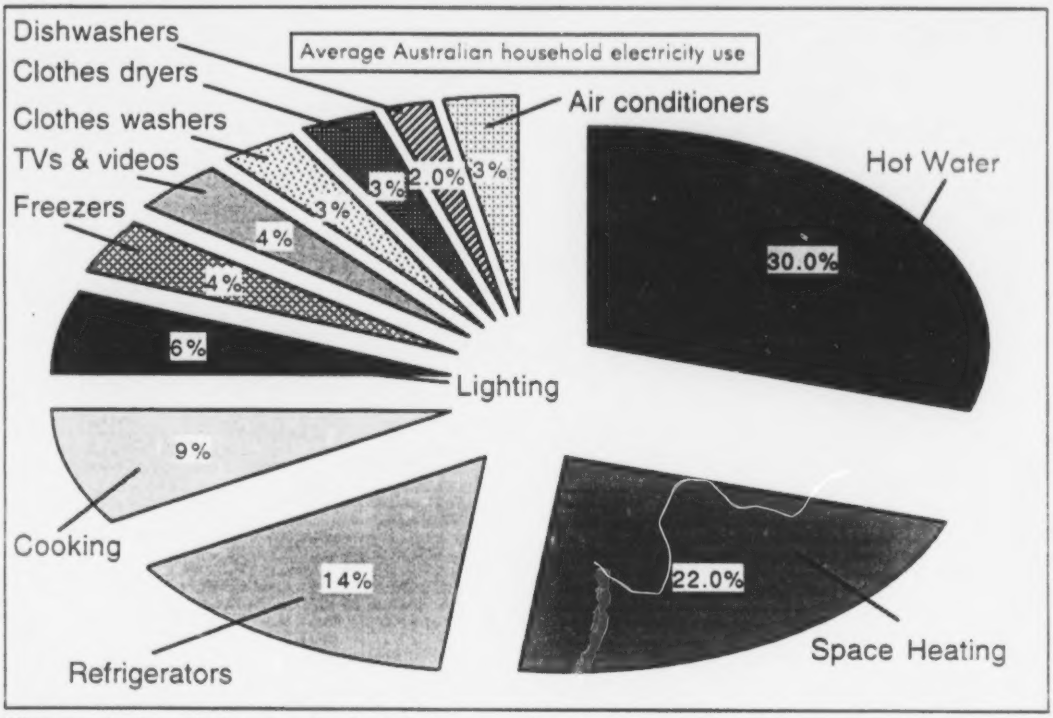

**Figure 3: breakdown of electricity use in the 'average' Australian home.**

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The final way of educating Australians about renewable energy which I think has great potential, is local day-long tours of alternative-powered homes. I have noticed a great increase in the popularity of home tours to raise money for schools in rural areas. Many of my readers have latched on to the idea of grouping ten or so homes over a weekend in a circuit. People pay an amount to receive a map showing the location of each home, and the funds go to the local school. People open their homes for one or two days a year to help the school. The visitors get to see (in this case) owner-built homes, and people love sticky-beaking at other people's homes. Alternative-powered homes could also be included on such tours, and I have no doubt they would be just as popular.

I firmly believe that Australia could emulate the success of programs such as the German '1000 rooftops' scheme, which was booked out 25 times over as soon as it was announced. This scheme involves installing subsidised solar power systems on suburban roofs, with the German power utilities agreeing to buy back excess solar power at a set rate. The same scheme has just been introduced by the Sydney electricity authority, Integral Energy, and CitiPower in Melbourne have a similar scheme. The Leichhardt City Council in Sydney is leading Australia by making solar hot water units compulsory in all new commercial buildings.

Stephen Ingrouille of 'Going Solar' has run his renewable energy business in North Melbourne since 1978. He has long said that solar hot water units should be compulsory in every new home built in Australia. At least 65 per cent of all hot water needs in southern Australia can be met with solar units, and this figure rises to 95 per cent in northern Australia. So, city and country people *can* embrace many forms of renewable energy, and I believe we have a moral duty to encourage such installations.

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# Evolving an Asian-South Pacific Framework for Adult and Community Environmental Education for Sustainable Societies

**Jose Roberto Q. Guevara**
**Environmental Education Program**
**Asian-South Pacific Bureau of Adult Education**
**175-B Kamias Road Extension**
**Quezon City, Philippines 1102**

## SUMMARY

A set of principles on adult and community environmental education is being developed from the experiences of educators from the Asian-South Pacific Bureau of Adult Education (ASPBAE). The principles recognise that environmental education is a life-long learning process that involves all of us as learners and educators; is interdisciplinary; integrates the historical, political, social, economic and cultural contexts; covers a wide learning spectrum, from awareness, understanding to action; values indigenous and local knowledge; recognises the role of both women and men in environmental protection, while contributing to the empowerment of women; is contextualised to the local and global realities, and explores participatory and creative learning methods that are culturally appropriate.

### An Evolving Framework, A Dynamic Process

In 1992, the Treaty on Environmental Education for Sustainable Societies was signed by representatives of the world's social movements and the NGO community who attended the International Global Forum in Rio de Janeiro, Brazil. The Treaty, a result of a global participatory process that was initiated before the Forum, attempted to integrate ideas and experiences towards developing an environmental education agenda for socio-ecological sustainability.

The Asian-South Pacific Bureau of Adult Education (ASPBAE), a broad network of adult educators in the region, actively participated in developing the Treaty and made a commitment to promote and implement its principles. To honor this commitment, regional workshops and 13 in-country experimental projects were conducted between 1993-1995 by members and partner organisations of ASPBAE's Environmental Education Program (EEP), to apply the principles and further contextualise these to the local realities.

In October 1996, adult and community educators who participated in the regional and in-country activities gathered to share their experiences and develop a framework for environmental education in the Asian-South Pacific region that will be presented during the General Assembly of ASPBAE in December 1996.

In addition to fulfilling ASPBAE's commitment to the Treaty, this process complements the current preparations for the Fifth International Conference on Adult Education (CONFINTEA V) in Hamburg, Germany in 1997, where environmental education is one of the ten major thematic areas that has been identified. A preliminary framework was presented during the Asia-Pacific Regional Consultation on Adult Education in September 1996 in Jomtien, Thailand, one of the preparatory consultations for CONFINTEA V.

This paper is part of this dynamic process of evolving a regional framework for adult and community environmental education. It presents the principles developed from the first five years of ASPBAE's EEP. It is intended to initiate further discussion on the particularities of environmental education in the Asian-South Pacific region and whenever appropriate, to serve as a guide to other adult and community educators who recognise the value of integrating environmental education into their programs.

## The Asia-Pacific Context: A Crisis of Globalisation

The marked growth of some economies in the Asia-Pacific region has resulted in massive environmental destruction, the marginalisation of peoples and the erosion of social and cultural values. All these can be attributed to the promotion of a perverted development paradigm by a global economic system that encourages consumption and that has resulted in a wider gap between the rich and poor peoples of the world. Despite this reality, the so called developing countries in the Asia-Pacific region are all keen in joining the race for the promised "development".

Amidst this scenario there is a growing awareness of the complex interrelationships between the factors determining genuine development, political democratisation and environmental destruction. Evidence of this are, the increasing number of development organisations in the region that continue to question and oppose the present global order, and the continued strengthening of peoples' movements actively involved in programs moving towards the attainment of a more sustainable future.

It is within this regional context that a framework on adult environmental education is being evolved from the experiences of adult and community educators in the region.

## What kind of development do we want?

Alternative concepts of development (e.g. sustainable development, participatory development, bio-regional development, etc.) continue to dominate discussions at the global, regional and national levels.

At the end of its 1991 General Assembly, ASPBAE articulated its understanding of sustainable development to incorporate the following basic features: it is people-oriented and environment-friendly; it takes environmental concern as integral to the development agenda and that environmental education is an agendum for action; it embodies the elements of social justice and equity; that poverty is a concern which is structurally related; it is gender sensitive and it addresses the basic conflict in resource use and allocation in the world.

Today, these conceptual debates continue. But debates alone will get us no where. We, adult and community educators, need to immerse ourselves in the experiences of our local communities who continue re-discover and create their own concept of sustainable communities. Education continues to be seen as a key within these community processes. However, education must work for and be accompanied by social, economic and political changes in accordance with our vision of socio-ecologically sustainable development for it to be relevant and effective.

## Experiences from the Asian-South Pacific Region

In January 1994, an Asian-South Pacific Regional Environmental Education Workshop was organised to initiate the process of developing the regional environmental education framework based on the principles identified by the Treaty and the experiences of the educators present. From this workshop, in-country experimental projects were developed and implemented by the participants. The nine projects included in this paper are briefly described below.
In India, Sarvahara Jan Andolan conducted a project called *Preservation and Development of Land Towards Sustainable Development of Tribals*. The project facilitated the development of the awareness of the schoolchildren and the tribal peoples about the protection of their Dali Lands through a learning exchange process that included forest visits, community meetings, vegetable plot cultivation and tree planting.

The Wild Life and Nature Protection Society of Sri Lanka wanted to educate rural women about the value of environmental conservation. The project entitled, *Environmental Education Project to Alleviate Rural Women Folk of Sri Lanka from Economic and Rural Brunt*, was primarily a Training of Trainers project that developed the capability of the school teachers to conduct environmental education activities with the local women using creative and participatory methodologies.

An *Environment Workshop for Social Workers and Educators* was conducted by the Conservancy Association, Hong Kong Environment Centre to provide a venue for community-based environmental educators to update themselves on local and global environmental issues and to share their respective education and community development experiences. Active learning methods such as field visits and hands-on experiences, such as water monitoring, were found to be very effective.

The Korea Federation for Environmental Movement conducted a *Mothers' Environmental Education Course* to inform mothers about environmental problems that affect them and encourage them to be involved in the environmental movement by becoming environmental leaders in their own homes and neighborhood. The course covered a wide range of topics from daily consumer issues such as waste management, to larger problems such as nuclear power.

*Environmental Education through Popular Education in Padang Seurahet, Johan Pahlawan Subdistrict, West Aceh, Indonesia* was the title of the project conducted by the Pugar Foundation (Center for People Movement Foundation). One of the findings of the project was that environmental education must begin from where the people are. For example, the entry point of the educator was to assist the community in planting wind breakers along the coast after a typhoon destroyed their homes. This opportunity to work together became their starting point for environmental education.

In the Philippines, the Cordillera Resource Center for Indigenous Peoples' Rights conducted a *Mountain Province Youth Farmers Basic Ecology Workshop.* The workshop was originally intended for their parents, however, more urgent issues that involved their parents, particularly the Value-Added Tax (VAT) campaign, required that this be implemented instead for their children. A major feature of this workshop was the re-discovery by the participants of their traditional agricultural knowledge and practices vis-à-vis the dominant modes of farming that is damaging to their health, the culture and the local environment.

A *National Training Workshop for Developing Literacy and Literacy Follow-up Materials on Environmental Education in Vietnam* was conducted by the National Organisation for Community Education, Continuing Education and Development (NOCEAD). The workshop trained literacy and post-literacy personnel to develop and use environmental education materials that were based on the specific ecological problems of their participants while taking into consideration the specific features of their lives and cultures.

Solomon Island Development Trust / Conservation in Development Program facilitated a number of *Education Awareness and Resource Management Training* sessions to encourage the local resource owners to maintain a healthy environment by providing information critical for decision-making. A key learning point of the project was the need to transform each topic according to the village peoples' level of interest and understanding.
In Fiji, the South Pacific Action Committee for Human Ecology and Environment (SPACHEE) conducted a *Creative Communications Workshop* that developed the skills of the local participants in the production of posters, T-shirts, sulus, radio jingles and popular theatre presentations to promote environmental awareness on issues such as forest conservation and local medicinal plants. While the workshop outputs were primarily used for environmental campaigns, particularly for Earth Day and World Environment Day, the participants saw campaigns as part of their environmental education work.

Aside from these experimental projects, additional information for the framework came from the 1993 Urban Environmental Education Workshop in Macau, the publication in 1993 of the ASPBAE Courier No. 55 on Adult Environmental Education and the ASPBAE EEP

Newsletter, *Learning for Environmental Action, Visions of Ecological Sustainability* (LEAVES).

## Principles of adult and community environmental education

These experiences indicate that adult and community environmental education is a life-long learning process that begins with initiating an awareness and appreciation for our environment, inculcating a deeper understanding of the complex interrelationships that exist, assisting in the identification of potential environmental action, and facilitating the development of the skills and capabilities of the key players in our communities for sustained environmental action.

While environmental education involves a broad range of community players and covers a wide variety of environmental issues, the following principles are shared, to varying degrees, by our experiences in the Asian-South Pacific region.

Environmental education recognises that ecological problems cannot be addressed separately from the historical, political, economic, social and cultural realities. These problems have to be understood within their local, regional and global contexts, making it necessary for environmental education to be progressively contextualised.

Environmental education needs to inculcate respect for indigenous and local knowledge. It should therefore facilitate the sharing and rediscovery of this knowledge and explore how this traditional wisdom can complement the generation of new knowledge.

Environmental education needs to liberate us from our primarily materialistic relationship with nature and encourage the rediscovery of nature as a spiritual support system of life.

Women in the Asian-South Pacific region continue to carry the brunt of improving the quality of life of the family and therefore are greatly affected by the worsening environmental crisis. Environmental education recognises the contribution of both women and men to environmental protection. It encourages their continued participation in environmental action while simultaneously addressing the issues of womens' empowerment.

Environmental education is participatory and experiential. Learning begins from peoples' experiences. It encourages the exploration and development of creative learning approaches and educational materials that are culturally sensitive.

Environmental action is inherent to environmental education. It recognises that individual action is part of a larger empowering process of collective environmental learning and action. Environmental action, like education is both a process and an outcome, hence it is also result-oriented.

Environmental education provides opportunities for those with a interest in environmental issues (stakeholders) to have a role in the planning, implementation, monitoring and evaluation of education programs.

Environmental research is an on-going process that is integral to environmental education. Research includes a wide range of activities and areas; from reflecting on our own practice as educators, surveying the needs of the local community, studying the status of the local environment, re-discovering local knowledge, to conducting policy research for advocacy.

Environmental education involves networking with individual (adults, youth and children) and groups (non-governmental organisations, peoples' organisations, government agencies, business corporations and academic institutions) at the local, national, regional and global levels. We are all learners and educators.

## Enabling environment for adult and community environmental education

These principles of environmental education can be realised only when and where local communities are free to participate, think, discuss, be critical, organise and implement solutions they see fit to address these environmental problems and the other issues that confront them. However, the current political environment in some countries in the Asia-Pacific region continues to discourage peoples' initiatives that espouse critical thinking and collective action. If environmental education is to succeed in empowering people to action, these conditions need to be addressed.

The challenge for ASPBAE and other adult and community educators in the region is to ensure that our environmental education efforts, while contextualised in the realities of the Asian-South Pacific region, can reach and be sustained at the level of our local communities where the daily struggle for environmental protection is fought and won.

# The North Keppel Island Experience - A New Approach for Marine and Environmental Education

**D G Hossack**
**Principal**
**North Keppel Island Environmental Education Centre**
**PO Box 1421**
**YEPPOON Q 4703**

## SUMMARY

The Queensland Department of Education's North Keppel Island Environmental Education Centre is unique. It's formation from a former private resort, through the efforts of diverse individuals and government departments is a tale of commitment and courage. Educational and environmental opportunities have been seized with the creation of the North Keppel Island Environmental Education Centre.

The Centre is the only education facility in Australia which:

- was designed to promote respect, care and concern for self, others and the natural environment
- is situated on a National Park Island
- is totally surrounded by the waters of the Great Barrier Reef World Heritage Area
- houses Australia's largest stand alone alternative energy system
- utilises and demonstrates a range of water and energy efficient products and processes
- has easy access to a diverse range of terrestrial and marine ecosystems
- can support any P-12 Key Learning Area with a focus on environmental education, or education in the outdoors
- encourages an appreciation of, and participation in, indigenous people's cultural knowledge and their experience of the environment.

Extensive and cooperative planning has also ensured that the Centre's facilities can support a focus on a futures perspective.

## Historical Perspective

A failed tourism venture on the North Keppel Island National Park provided a unique opportunity for the Queensland Department of Education to develop an Environmental Education Centre with a difference. After four years of extensive and consultative planning, the Centre is now operational, and was officially opened in August, 1996. Establishing the Centre was not an easy task! There was no initial guarantee of funding, no commitment from Central Office personnel, no policy for establishment processes, no staffing commitment, no plans available from the previous developer. Indeed, the

Centre's establishment is a clear example of the acclaimed action-research model in action.

Consultation

The tremendous "grass roots" support for the Centre's establishment was balanced by a number of government departments and commercial enterprises. This was demonstrated by the involvement of:

- Aboriginal descendants
- school communities throughout Capricornia Region
- QCPCA
- QTU
- Department of Education Regional Office personnel
- Department of Mines and Energy
- Department of Administrative Services
- Livingstone Shire Council
- Central Queensland University
- Lands Department
- National Parks
- QAS
- Marine Parks
- Department of Primary Industries - Water Resources

Working parties from the above prepared a Draft Management Plan which became the basis for development, as well as a key instrument in a number of funding submissions.

Location

The Centre is uniquely located on North Keppel Island, a National Park island which is wholly situated within the Great Barrier Reef World Heritage Area off the Capricorn Coast, Central Queensland.

North Keppel Island is approximately 627ha in area and is a dominant landscape feature of Keppel Bay. The Island and it's surrounding waters have exceptionally high amenity and natural values in terms of fringing coral reefs, attractive beaches, rugged headlands together with a variety of natural land systems. The following list provides a glimpse of the range of values of the island.

Natural Values

- numerous fringing coral reefs
- four general marine environments
- extensive grassland communities
- eucalypt dominated open forests
- nine individual beaches
- two major tidal creek areas
- mangrove communities
- low closed woodlands

### Cultural Values

North Keppel Island has a history of habitation by the Kanomi People dating back some 4000 years. Cooperative planning efforts have assisted in ensuring that appropriate information about the aboriginality of the island can be included in curriculum programs. The physical remains of traditional occupation provide a resource for interpretation of cultural heritage. Descendants can assist with program implementation.

### Amenity/Recreational Values

North Keppel Island was gazetted as a National Park in 1964. Camping sites, with amenities, exist away from the Centre should user groups wish to focus on bushwalking, campouts, survival skills or other adventure based curriculum. Existing and planned walking tracks provide for easy to moderate secure walking, and excellent views of the Keppel Bay area. On a calm, clear day the crystal clear, blue waters, which cap against white, sandy beaches set below palm fringed foothills provides an aesthetic experience difficult to surpass. Swimming, snorkelling and other water activities are enhanced through the many sheltered beaches and numerous fringing reefs which surround the island.

### Facilities

- As the core unit for curriculum development in Queensland schools is the teacher and class, the Centre has been designed to support and cater for intensive learning programs for 40 people. Stage 1 of North Keppel Island Environmental Education Centre is now complete.

The following chart demonstrates the relationship between concept and existing facilities, and provides comments where applicable.

| CONCEPT | FACILITY | COMMENT |
|---|---|---|
| Energy Efficiency | Australia's largest stand alone alternative energy system. | Totally funded by Queensland Transmission & Supply Corporation and Queensland Department of Minerals & Energy as part of a monitoring and development project. |
| | Sky tubes - building design for ventilation. | Recently winner of National Award for Energy Management. |
| | Electrical appliances are the most energy efficient available. | Greenhouse gas emissions reduced from 39 000kg/year to approximately 8 000kg/year. |
| | Energy management LON system. Energy meters on all buildings for student monitoring. | appliances on demand during terms of high renewable energy availability. |

| CONCEPT | FACILITY | COMMENT |
|---|---|---|
| Water Efficiency and Quality | Water reducers on showers and hand basins.<br>Compost toilets - worm based.<br>Water meters on all buildings for student monitoring. UV treatment for potable water and greywater is similarly treated prior to irrigation. | Average domestic water use in Rockhampton is approximately 700L/person/day. Average Centre usage is approximately 60L/person/day. Interceptors on all tanks. |
| Classroom<br>Kitchen<br>Dining Room | Multi purpose building. | Houses groups of up to 40 with commercial kitchen and design for energy efficiency. |
| Accommodation | Five cabins with capacity of 40 people total. Toilets, showers and bathrooms are attached to individual cabins. | Design promotes small group work rather than the large "dormitory" style of other similar Centres. |
|  | Three cabins for core staff. | Fully self contained, partly funded by Central Queensland University. |
| Laundry | Laundry | Appliances include the most energy and water efficient washing machines. No dryers. |
| Curriculum Support | Dry Lab/Resource Centre | Stereo microscopes, classroom and teacher reference facilities. |
|  | "IMPACT" 8.2m sharkcat in survey for 23+1. | Access for transport, catchment studies, diving/ snorkelling, water quality monitoring, research, plankton trawling. (Funded by Central Queensland University) |
|  | Curriculum Resources | Microscopes, texts, minimal impact bushwalking, problem solving, recreation, snorkelling gear (wetsuits, masks, fins). |
| First Aid<br>Principle's Office<br>Administration<br>Teacher Area | Administration Building | Centrally located. Houses all communication systems for watercraft and groups away from Centre. Houses comprehensive first aid station equipped to isolated environment standard. Houses display panel for power alarms, weather, refrigeration alarms, water capacity, gas holding, energy loads. |

## Programs

Many Centres throughout Australia are limited in their offerings due to access to resources, physical location and constraints of workplace requirements. To exist under these limitations, many Centres are forced to offer a restricted selection of activities and programs which are often regarded as excellent in themselves, however, limited to specific elements of a few key learning areas for limited age groups. If we are to be "fair dinkum" about the role of Environmental Education Centres in supporting curriculum, consideration must be given to ownership of the program by client groups.

To achieve this goal, the North Keppel Island Environmental Education Centre requires intending client group teachers, and their families where possible, to attend an orientation workshop for two to three days. These workshops provide opportunities for:

- approved support staff promotion
- island environment familiarisation
- professional networking
- resource familiarisation
- requirements for working on National Park/Marine Park
- detailed program planning sessions.

These programs have been so successful that the Centre has regrettably needed to refuse those who do not have direct program implementation responsibilities. It is also further testimony to the professionalism and commitment of teachers. This process also ensures that the Centre remains vibrant and responsive to school needs, whilst at the same time contributing to curriculum leadership in environmental (and marine) education, and effective teaching strategies. All programs are therefore unique. For example, a few programs conducted during 1996 include:

| PROGRAM | MAJOR KLA LINKAGES | EXAMPLE ACTIVITIES | FOCUS & KEY ELEMENTS |
|---|---|---|---|
| Year 12 Geography | SOSE - Social Education | Landform Studies<br>Zonal Studies & Identification<br>Facilities Orientation<br>Alternative Energy Studies<br>Ecological Sustainability Debate<br>Guest Speaker - Management Plans | Management Plans Development<br>Time Continuity & Change<br>Natural Systems<br>Investigation<br>Management & Enterprise<br>Environmental Knowledge |
| Year 12 Multi Strand Science | Science Education | Water Quality Monitoring<br>Bathometry<br>Dunal Studies<br>Wave Motion Studies<br>Biodiversity Studies<br>Lunar/Tidal Studies<br>Astronomy<br>Plankton Analysis | Process Skills<br>Energy, Space<br>Time & Motion<br>Biology<br>Positive Attitudes<br>Marine Ecology<br>Cause & Effect |

| PROGRAM | MAJOR KLA LINKAGES | EXAMPLE ACTIVITIES | FOCUS & KEY ELEMENTS |
|---|---|---|---|
| Year 5 - Cultural | SOSE | Midden Construction<br>Midden Interpretation<br>Environmental Issues Resolution<br>Language - Darrumbal<br>Bush Tucker Activities<br>Plant Identification<br>Log Swimming<br>Fish Hook Making<br>Kanomi Video<br>Zoning Simulation | Culture<br>Natural & Social Systems<br>Resources<br>Place & Space<br>Time Continuity & Change<br>Investigation Communication & Participation<br>Spirituality<br>Conflict Resolution<br>Human Impact<br>Reconciliation |
| Small School - Years 1-7 | Maths<br>SOSE<br>English<br>Health & Physical Education<br>Technology | Spotlighting<br>Possum Research<br>Minimal Impact Bushwalking<br>Campout<br>Swimming<br>Maths Trail<br>Snorkelling<br>Reef Walking<br>Reef Comparisons<br>Plankton Trawling<br>Microscope Studies<br>Wind & Solar Energy Studies<br>Cultural Activities<br>Mangrove Study<br>Recycling<br>Composting<br>Tree Planting<br>Dugong Research | Catchment Care<br>Landcare<br>Skill Development<br>Initiative<br>Trust<br>Success<br>Environmental Responsibilities<br>Process Skills<br>Moving Through Water<br>Food Webs<br>Energy Cycles<br>Study of Man's Effect on a Particular Area<br>Forces & Motion<br>Erosion<br>Human Relations<br>Safety |
| Year 8-10 Aboriginal & Torres Strait Islander Tertiary Access Program | English<br>LOTE<br>The Arts<br>Health & Physical Education | Darrumbal Language Activity<br>Traditional Owner Activity<br>Role Playing<br>The Minority Experience<br>Cultural Walk<br>Ropes Course<br>Camp Fire Activity<br>Weaving & Painting<br>Goal Setting<br>Treasure Hunt<br>Story Telling | Drama<br>Sea Safety<br>Cooperation & Communication<br>Stewardship<br>Spirituality<br>Cultural Diversity<br>Conflict Resolution<br>Interactions in, with and for the Environment<br>Human Impact<br>Cultural Heritage<br>"Futures" Perspectives |

## Curriculum Scope

The following is an indication of the curriculum scope, and has been developed by classroom teachers and community members throughout Capricornia Region.

North Keppel Island Environment:

Environmental Issues - eco design, human impact, stewardship, water quality, mainland impacts, Aborigines, resource management, zonal debates.
Values personal philosophy - identity, uses, pride, cooperation, success, beliefs, spirituality.

Social Issues & Awareness - interaction in, with, for the environment, conflict resolution, conservation & management, cultural diversity, preservation

Skills - decision making, action, manipulative, mariners, applied scientific method, physical communication.

Creativity - the arts, divergent thinking, teacher training.

Environmental Awareness and Knowledge - cause and effect, marine ecology, astronomy, weather, biodiversity, geomorphology, biotic/abiotic, flora/fauna, waves, currents, tides.

Environmental Appreciation - eco tourism, sacredness, aesthetics, Island history, white settlement, geomorphology, geology.

Social Environment

Interaction, group challenge,initiative, active listening, active participation, enjoyment, cooperation, group management, self management, group or team work, enjoyment, active participation, communication, group or team work,
behaviour, negotiating, respect, interpreting, interpersonal relationships, leading, respect, supporting, trust, support, leadership, fellowship, responsibility, coordination, managing/leadership/ fellowship roles, empathy, valuing, negotiating, supporting.

Personal Environment

Commitment, confidence, success/failure, risk taking, risk assessment, self management, skill development, self reliance, self preservation, enjoyment, challenge, motivation, rewards, enjoyment, success, self esteem, self concept, success, self respect, confidence, image, self worth, self acceptance, purpose, awareness, image, values, beliefs, spirituality, sexuality, identity, purpose, initiative, responses, problem solving, decision making, cooperation, trust, decision making, cooperation, interaction, acceptance, communication, non verbal, verbal, acceptance, interaction.

## Conclusion

Extensive planning and funding support has resulted in the establishment of this unique learning Centre. Its continued development and role as a curriculum support centre will be impacted upon by a number of variables. Its success will be determined by client group satisfaction. The following are offered as an indication of support by clients who have visited throughout 1996.

Anecdotes

"The North Keppel Island Environmental Education Centre is an excellent Centre for Marine Studies. The close proximity of the Centre to reefs ensures time is used to its adequate. I found that the Centre provided myself and my students with the excellent opportunity to combine theory with practical and field skills. The experienced staff and their friendly help is the finishing touch to the Centre."

Louise Peach
Teacher
Glenmore State High School

"Our society's future decision makers can visit this Centre and gain positive first hand experiences with environmental best practice e.g. solar and wind power, sky tubes, water saving shower heads. Any visit 'value adds' to the student's learning for a sustainable future."

Gary Holmes
Teacher
Glenmore State School

"Gladstone State High has been fortunate to have used North Keppel Island Environmental Education Centre to support our Multi-Strand Science program in 1995 and 1996. The Centre is ideal because you make your own program to suit your needs. The staff and Centre are both excellent resources to support any program."

Clayton Campbell
MSC Coordinator
Gladstone State High School

"Bluff State School Year 5-7 visited North Keppel Island Environmental Education Centre in June 1995 and June 1996. Both camps were very successful due to collaborative planning, enthusiastic and skilled Centre staff participation, excellent facilities and superb catering. On both occasions, students left the island with enhanced environmental and social perspectives."

Andrew Walker
Principal
Bluff State School

# The Use of the Internet in Environmental Education
# or
# Surfing the Environmental Web

**Steve Johnson**
**Interpretation and Education Section**
**Parks and Wildlife Service**
**GPO Box 44A Hobart**
**Tasmania 7001**

## SUMMARY

The phenomenal increase in the use of the internet heralds a new era in the way people communicate ideas. For environmental educators, it provides an opportunity to both locate relevant resources and to broadcast an increasingly important message — all through a medium that offers the advantages of speed, cost-effectiveness, updatability and seamless integration of text, graphics, audio and video. The internet is being used by an increasingly broad cross-section of society, and is set to become increasingly relevant to students. Due to advances in the user-friendly nature of computer technology, accessing a particular topic is often as simple as typing in an appropriate key-word, while contributing to this rapidly expanding pool of information is almost as easy as using a standard word processing application.

## Introduction

In the mid-fifteenth century Johann Gutenberg invented the printing press and, in doing so, changed the world. The written word — perhaps the greatest invention of Humanity — became the printed word, allowing the collective knowledge of humankind to become available to an increasingly literate public and paving the way for the exponential growth of knowledge that has shaped the modern world.

In the 1960s, computer engineers funded by the US Defence Department's Advance Research Projects Agency, developed a network of computers designed to link to each other through telephone hook-ups. Their goal was not the creation of the internet as we know it today, but development of a data network that could survive nuclear attack — the internet was born out of the global paranoia of the Cold War. In the 1980s, this network of networks, which became known collectively as the internetwork, or more commonly the internet, expanded at an unparalleled rate. The medium continues to expand.

The printed word remains the primary means by which messages are spread, and the developing internet offers a powerful medium by which to enhance this dissemination. Its value to those involved in environmental education is clear, for today there is an imperative message that needs to be conveyed — a message that Gutenberg could never have conceived. The relentless march of progress — itself propelled by the power of the printed word — has led Humanity into a precarious world. Increasing realisation that the demands of an economic system based on the fallacy of unlimited economic growth cannot be met by a fragile and finite Earth, has led to a burgeoning of the philosophy of environmentalism. Its messages are clear and desperately urgent.

### What is the internet?

The internet is essentially a vast collection of computer networks that communicate with each other through a common protocol — the TCP/IP (Transmission Control Protocol/Internet Protocol). Using a technology known as packet switching, transmitted data are broken into small, easily managed sections and sent at near the speed of light across a complex tangle of wires and a maze of routers and gateways to their final destination. At the user's end, a software application somehow makes sense of these incoming signals and formats them upon the screen in the manner in which the author intended.

From a user's point of view, the internet serves three main functions. Electronic mail, or email, is a relatively straightforward application of the technology which has already become commonplace. Usenet — a concatenation of Users Network — is effectively a global forum through which people can share information. Usenet newsgroups discuss a vast variety of topics, allowing subscribers to put forward their thoughts and ideas in a manner reminiscent of a bulletin board. The potential value of such a pooling of ideas from like-minded people around the globe is considerable. For most people, however, the internet is best known for the enormous fund of information, complete with colourful, eye-catching graphics, sound and video, that is available through the World Wide Web.

### Who uses it?

The common perception of the average user as a young male technophile does not conform with recent surveys. Current, albeit, limited studies of user demographics suggest that the medium is being used by an increasingly broad spectrum of society.

Although any estimate of the number of people using the internet is quickly dated, recent estimates suggest 800 000 Australians are connected, with over 45 million people connected world-wide. Despite its small population, Australia is the fifth largest user of the internet. Today, it continues to grow at exponential rates, with some estimates suggesting an increase of 20% per month in the volume of messages transferred.

Within Australian schools, the use of the internet is set to increase dramatically. Both the Victorian and NSW Governments have declared their commitment to having all State schools on line by the year 2000. Clearly, the internet will become increasingly relevant as an educational tool.

### Of what value is it to environmental educators?

Like any other medium of communication, the internet is only as useful as the information it contains. Yet, despite its infancy, the internet already provides a massive pool of resources, including much which is relevant to environmental education.

Some of these sites take advantage of the multimedia capabilities of the medium. For example, the Australian Antarctic Division (http://www.antdiv.gov.au/), besides providing information about the continent, its wildlife and the operation of the Division itself, includes live (well, nearly live) video footage of the area around Mawson Station. The Department of Conservation and Land Management, WA (http://www.calm.wa.gov.au/ index.html) has incorporated video footage of the dolphins of Monkey Mia into its site, while the Tasmanian Parks and Wildlife Service (http://www.parks.tas.gov.au/tpws.html) is in the process of incorporating audio and animation into its site on the Tasmanian Wilderness World Heritage

Area. Other Government departments which have contributed a range of topics to the Web include the Australian Nature Conservation Agency (http://www.anca.gov.au/) and Victoria's Department of Natural Resources and Environment (http://www.dce.vic.gov.au/), as well as the Environmental Resources Information Network (http://kaos.erin.gov.au/erin.html), which is one of many sites that contain a plethora of links to a wide variety of environmental issues.

Conservation groups have also staked a presence of the Web, including:

- World Wide Fund for Nature (http://www.panda.org/home.htm)
- Greenpeace Australia (http://www.sofcom.com.au/Greenpeace/index.html)
- Rainforest Action Network (http://www.ran.org/ran/)
- ARK Australia (http://www.planet.ark.com.au/arkozhome.html), which also uses video in its web site.

The above listing is just the tip of the iceberg. Many more high-quality and authoritative web sites relating to environmental education are available.

**Advantages of the internet**

Information available through the internet is generally more current than that available through traditional media and, unlike traditional media, can be easily and inexpensively updated, expanded and improved. The internet also offers the potential to dramatically reduce the amount of time that it takes to find information — a great bonus for young, impatient students who suffer the demands of modern scholastic life. A great bonus, too, for those who teach them.

One of the advantages of the internet over conventional forms of information transfer is its ability to integrate text, graphics, audio, video and even 3D video and virtual reality. The use of multimedia allows information to be presented in a multi-sensory and interactive manner — an important consideration for educators in their efforts to engage student interest and enhance learning.

The obvious constraint with using the internet to locate information is that the particular information you seek simply has not been put up. This constraint, of course, can be ameliorated if environmental educators seize the opportunity to promote environmental issues through a medium of communication that seems ripe for expansion, and that is becoming increasingly relevant to our students.

**How can I get into it?**

For the uninitiated, the World Wide Web of the internet may appear more complex than the World Wide Web of Nature. However, due to rapid advances in the useability of the technology, both accessing and contributing to the Web are relatively straightforward tasks. Easy-to-use browser applications, such as Netscape and Microsoft's Internet Explorer, and powerful search capabilities, make accessing the resources available as simple as typing in a keyword.

For those who wish to make their own contribution to the World Wide Web, there are a number of software applications available which overcome the need to engage in steep learning curves — once you have come to terms with the profusion of acronyms and neologisms that infest cyberspace. Editors used to produce Web pages come in two types — WYSIWYG (what you see is what you get) and those that shuttle between editor mode and browser mode. The editor mode allows you to enter text, graphics and other media, as well as the necessary

HTML (hypertext markup language) 'tags'. The browser mode allows you to preview the result on screen.

Commercial software applications, such as Adobe's WYSIWYG PageMill 2.0, simplify the process and are not much more difficult to use than a standard word-processing application. Other highly useful applications are available as shareware. For a nominal fee, applications such as Page Spinner allow a high degree of control over the use of HTML. Consequently, you have full control over the graphic capabilities of the medium.

### The basis of HTML

To convert written text and associated graphics, sounds and movies into a form that can be read by a browser application, HTML 'tags' need to be put in place to tell the browser how to format the information. Such HTML 'tags' form the basis of producing a Web page.

By way of example, try entering the following in any normal word processing application, such as Microsoft Word, and save the document as a text only file (i.e. without the invisible characters that a word processor uses to determine formatting):

```
<HTML><BODY><H1>An example of HTML</H1>The
capitalised characters which occur within the angular brackets
determine the appearance of the text, dictating whether it will appear
in <EM>italics </EM> or <B>bold</B> or a <FONT SIZE=5>
different size font.</FONT><P>Such 'tags' also control the
<BLOCKQUOTE><LI> formatting of text elements,
</LI></BLOCKQUOTE>as well as handling a plethora of more
complex additions such as graphics, audio and video.
</BODY></HTML>
```

Then open the file from within an internet browser application — there is no need to be 'on line'. The result should appear with the 'tagged' words appropriately formatted.

The above is a simple demonstration of the basis of HTML (the things that appear in 'tags'). It is not necessary to learn HTML to be able to put together a Web page. Most HTML editor applications insert the tags for you when you select an appropriate command in a menu, more or less as you would when formatting a word processor document. However, a knowledge of the language will allow you to take full advantage of its capabilities. Full details of HTML and the steps involved in creating a web page are available on line at such sites as:

- http://www.w3.org/pub/WWW/MarkUp/
- http://home.netscape.com/home/how-to-create-web-services.html

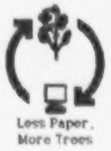
### The Internet as an environmentally-friendly medium?

As we cut down forests to produce the paper that we make into conference proceedings, and burn fossil fuels to transport conference delegates to their seats, we might look twice at the advantages of a system of communication that relies largely on the abundant materials of silicon, oxygen and aluminium. Video conferencing is now possible through the internet. Although the quality of video and audio presently leaves a lot to be desired, developments in this area, in conjunction with increasingly powerful computers, will no doubt lead to dramatic improvements in performance. Soon we may have the option of holding small-scale conferences without the need to leave home — although whether this is a good thing is questionable!

The prediction of the early 1980s that the computer age would lead to a massive decrease in paper consumption has proved to be spectacularly wrong. Government departments, businesses and educational institutions are using greater quantities of paper than ever before. In addition to providing information on environmental issues, we have the opportunity to promote reduced paper consumption and environmental awareness in the use of information technology. Global forums, in the form of Usenet groups, could be established to discuss the environmental ramifications of computer technology.

In designing Web pages — particularly those concerned with environmental education — consider ways in which your reader can be discouraged from printing out the information you provide. For example, using a sans serif font and a larger font size on a suitable background will enhance readability for the many users who allow the document to specify these browser parameters. Of course, when perusing Web pages, you can override the parameters set by the author of a page and specify the font size and background to suit your own requirements. Stark white backgrounds, screen glare, failure to set screen brightness and contrast to a comfortable level and the untextured nature of the screen display also reduce the ease with which lengthy passages of text can be read.

Perhaps one way of promoting reduced paper consumption is to use a logo, such as:



and place it at the bottom of each Web page you create. The logo could be linked to a page which encourages your reader to refrain from printing out your information and to store information electronically rather than in hard copy.

**The problem with the internet**

Unlike other forms of mass media, the internet has not, as yet, become monopolised by commercial interests, and is ahead of political, religious or social forces that would normally curtail expression — as such, it is perhaps a clearer reflection of society than any other single medium. Yet this anarchistic nature of the internet is often a cause of concern for teachers who feel that they have little control over what sites their students are accessing. Issues of censorship, subversive and indecent content, and even copyright are yet to be resolved.

The internet is still a relatively recent innovation, complete with its share of teething technical problems. Choked telephone lines and slow modems can reduce the pace of information transfer from close to the speed of light to something more like the speed of a donkey cart. Lack of standardised indexing often results in frustrating searches for particular information, with a search for AAEE, for example, as likely to turn up a recipe for fruit soup or the Australasian Association of Engineering Education.

Finally, the internet suffers one fatal limitation — it is simply not the real thing. Knowledge gained through this medium lacks the affective impact of knowledge gained from direct experience of the environment. To lead a small group through majestic rainforests, or across vast alpine plateaus is to lead people on a journey that is both outward and inward. To experience such places, and to learn of their natural and cultural heritage, affects the heart as much as the mind.

And environmental education today needs to change hearts as much as it needs to change minds.

# Australian Students Environmental Concerns and Opinions of Their Living Environment

Tammy Kwan and John Miles
School of Professional Studies
Centre for Applied Environmental and Social Research
Queensland University of Technology

## SUMMARY

This paper reports the first part of the findings of a study which investigated the nature of the environmental concerns and opinions that students have during the upper primary, junior and senior secondary education in Australia. The study adopted a qualitative multi-method design, using open-ended question items and focus group discussion, to capture and identify students' qualitative opinions of the environment through the way they see the world around them. It reveals that the upper primary students are more concerned about their immediate personal environment while the junior and senior secondary students treasure more of the natural environment with regards to the natural features, plants and animals when they are confronted with positive images. On the other hand, all students opined negatively towards the social environment, from local to national and then global, and would like to commit action to change these annoying and worrying things in their social environment. In general, children have expressed strong identification and pride in their natural Australian environment but have concern in their living social environment which generally refers to the community, society, country and the world.

## INTRODUCTION

Appropriate knowledge concerning environmental issues, critical reflection in forming environmental opinions and beliefs, and the practise of responsible environmental behaviour have been regarded as the ultimate goal of environmental education (Ramsey *et al.*, 1992; Stapp, 1969; UNESCO, 1985). However, there has been much debate over the relationship between environmental knowledge, attitude and behaviour. Traditional environmental studies (Hungerford and Volk, 1990; Newhouse, 1990) revealed a strong focus on the idea that increased knowledge of environmental issues lead to increased awareness, and an increased awareness leads to a greater motivation to behave in a more responsible way towards the environment. Yet, Hines *et al.* (1987) commented that such a linear connection is not necessarily the case. Hines *et al.*(1987) and Stapp (1992) suggested that individuals who felt some personal responsibility toward the environment were more likely to have engaged in responsible environmental behaviours than were individuals who felt no such feelings of responsibility. Thus, an individual's intention to act is the result of a number of variables acting together, such as cognitive knowledge, cognitive skills and personality factors. However, just the individual's desirability to act is not strong enough to predict environmental behaviours because of other obscuring situational factors. Ajzen and Fishbien (1977) proposed that behaviour can be predicted by an individual's intention which is determined by the individual's attitudes towards behavioural and subjective norms. In turn, attitudinal and subjective norms can be explained in terms of beliefs about the consequence of performing that behaviour and about the normative expectations of relevant referents. They considered that in the course of a person's life, his/her experiences lead to the formation of many opinions and beliefs about various objects, actions, issues and events. These opinions and beliefs are formed as the result of direct observation, the acquisition of information, and through self generated inference processes.

Ramsey (1992) made an attempt to clarify and define a number of terms that are used commonly amongst researchers in environmental education. Knowledge of environmental issues refers to one's understanding of specific environmental issues. Beliefs about environmental issues refer to an individual's position on an issue. Values refer to the relative merits that an individual places on issues related to the environment. Values can influence how an individual feels and behaves with respect to these issues. Individual locus of control is an individual's perception of whether a particular action will result in an anticipated reinforcement for acting. Environmental sensitivity refers to the belief that humans must live in harmony with the environment. Knowledge of and skills in environmental action strategies refer to the ability to use citizenship action skills to influence decision-making in a society (Ramsey, 1992:31-32).

Cade (1990) used the term 'environmental opinion' in preference to 'environmental issues' as she considered the former contained personal connotation which is a more helpful and less misleading phrase than the latter which appears to be factual and impersonal. She believed that it is the opinions and perceptions of issues that are more important in education than the mere knowledge of the issues themselves. The term 'environmental opinion' hence implies a uniqueness to other individuals or a group, and therefore opinions are arguably more socially useful and highly treasured by children than knowledge, theories, or even some skills that educationists believe are so vital for them. Opinions are verbal, written or recorded expressions of knowledge, attitudes and values and as such are more tangible in terms of teaching and learning (Cade, 1990:10).Knowing opinions towards the environment is important especially for environmental education and it has been on top of the educational agenda since the publication of the Belgrade Charter and Tbilisi Declaration (UNESCO, 1978) to promote the long-term task of teaching environmental education in school to foster and re-inforce students' attitudes and behaviours in their daily life (Kwan, 1995).

With this background information in mind, Australian schools have been given due encouragement to advance environmental education in an integrated inter-disciplinary manner so that it allows the goals of environmental education to materialize and be fulfilled. However, to claim a satisfactory degree of achievement in the teaching of environmental education, teachers need to identify and draw on children's opinions about environments and be able to help children to form and judge such opinions, whether they are their own or those of others. Such abilities of opinion formation and judgement are an essential part of eduction for the environment, and among those required for future citizenship.

## AIM AND OBJECTIVES OF THE STUDY

This study, framed in a qualitative research paradigm, seeks to identify and investigate the nature of the environmental opinions that students have in the upper primary, junior and senior secondary education in Australia. This aim is to achieve through the following three objectives:

1. The categorisation of the students' responses into 'personal', 'social' and 'global' opinions which reflected their concerns and care about the world.
2. The development of the qualitative different opinions towards the environment that the students expressed based on their personal, social, national and global concerns.
3. The investigation of these qualitative different opinions and concerns towards the environment in upper primary, junior and senior secondary education levels.

## RESEARCH METHODOLOGY

**Design** This study adopted a qualitative multi-method design which as Brewer and Hunter (1989) indicated allows for the integration of distinctive research methods into a coherent investigation of a specific research problem. The multi-method approach hence is a strategy designed to overcome the use of one single research method due to its inevitable potential weaknesses and limitations and to provide the result of triangulation. The study was designed to capture and identify students' opinion of the environment through the way they see the living environment around them - by firstly the completion of five open-ended question items, and by secondly the formation of students into groups according to their educational level to reflect jointly in a focus group discussion. The use of these qualitative techniques was to identify the meaning, significance and changes in the various samples (upper primary, junior secondary and senior secondary) of students's environmental opinions which reflect their knowledge, attitudes and concerns (Hausbeck *et al.*, 1992; Hillcoat *et al.*, 1995; Lyons & Breakwell, 1994).

**The study group** Sixty-nine students from two south-side metropolitan Brisbane schools were invited to participate in this study. Twenty-five of them were from a multi-age class of upper primary of years 5 to 7. Twenty-seven of them were in year 8 junior secondary and the remaining seventeen were in year 12 senior secondary. There is gender balance within and between the student groups involved in the study. Table 1 shows the gender, age and grade level distribution of the sixty-nine participating students. The two participating schools come from the same geographical-environmental constituency. Students of the three class levels were chosen to find if there is any significant qualitative difference between their opinions and concerns towards the environment with students's age.

Table 1: The gender, age and grade level information of the study groups

| **Student Groups** | **Grade Levels** | **Age Range** | **Gender** | | |
|---|---|---|---|---|---|
| | | | **Boys** | **Girls** | **Total** |
| Upper Primary | Years 5 to 7 | 9 years 1 month to 12 years 6 months | 12 | 13 | 25 |
| Junior Secondary | Year 8 | 12 years 0 month to 14 years 3 months | 13 | 14 | 27 |
| Senior Secondary | Year 12 | 16 years 6 months to 18 years 0 month | 9 | 8 | 17 |
| **Total** | | | **34** | **35** | **69** |

**Methods** The 69 students who participated in this study were asked to respond to 5 simple open-ended questions about their feelings towards and seeing the living environment around them. The word 'environment' did not appear in the questions as such, as inclusion could induce the students to express their concerns deliberately towards the environment to 'suit' the interest and the preference of the researchers. The responses were subsequently coded and classified to reflect a 'personal' or 'social' or 'nature' concern. This also gives the students the freedom to truly reflect on their own opinions genuinely. The five questions were:

1. Name up to 3 things that you treasure very much.For each, explain briefly why you treasure it.
2. Name up to 3 things that you think are great and important. For each, explain briefly why its change or disappearance would upset you.

3. Name up to 3 things that annoy you most? For each, explain briefly why it annoys you.
4. If you were given the power, name up to 3 things that you would like to change. For each, explain briefly why you would like the change.
5. Beyond your immediate local area, e.g. near Brisbane or even overseas, name up to 3 things that worry you a lot. For each, explain briefly why you would or want to change or stop it.

These five questions were structured to encourage the students to opine on positive things first before coming to express their concerns on some negative things (for instance Questions 1 and 2 are both positive while Question 3 is negative). The questions also gradually distance further away from the individual to embrace things outside Brisbane and Australia (for instance Question 5). Instead of just asking the students to opine on things they like or dislike, they were also asked to express concern over 'assumed action' to bring about changes to things they saw as negative (for instance Question 4).

Immediately upon the completion of the open-ended questions, the students of each class level were divided into 3 groups of 8 or 9 to participate in a focus group discussion. The purpose of the discussion was to enable the students to articulate their feelings freely and to express at a deeper level their understanding, feeling and opinion on what they had written in the open-ended questions. Due to school time table arrangements, only one group of focus group discussion was held for the junior and senior secondary students. All upper primary students were able and happy to participate in the rigorous discussion. All the five focus group discussions were video-recorded and subsequently transcribed for interpretation and analysis.

This rest of this paper will concentrate on and discuss the findings related to the first objective (see aim and objectives of the study above) while the second and the third objectives are still under the process of transcription and interpretation. The outcome of these two objectives will be discussed in another paper in the near future.

## FINDINGS:

By working through the five question items that were responded to by the sixty-nine students, the researchers have come up with a 3-tier classification of their responses. The students generally expressed concerns to three different modes of environments, namely their **personal** immediate environment about themselves, their parents and siblings, and their friends; their **social** environment relating to the community, society, country and the global world; and **natural** environment such as animals and fauna, plants and flora, and other natural features such as beach, air and water etc. Table 2 summarizes the classification of opinions and concerns expressed and the codes used for each tier and sub-tiers.

Table 2: Classification and coding of the children opinion responses

| Code | Classification of Environment as concerned & opined by students |
|---|---|
| Ps | Personal Environment - relating to self, personal belongings, hobbies, ... |
| Pp | Personal Environment - relating to family, parents, brothers & sisters, ... |
| Pf | Personal Environment - relating to friends, neighbours, classmates at schools, ... |
| Sc | Social Environment - relating to immediate neighbourhood, community, |
| Ss | Social Environment - relating to society in general |

| | |
|---|---|
| Sn | Social Environment - relating to the nation, country |
| Sg | Social Environment - relating to the global world |
| Na | Natural Environment - relating to fauna, animals, wildlife, ... |
| Np | Natural Environment - relating to flora, plants |
| Nf | Natural Environment - relating to natural features such as beach, air, river,water,... |

**Things that the students treasure very much and consider to be important**

The findings of students' concerns and opinions towards the environment reveal a distinctive pattern between primary and secondary students. The primary students expressed a great concern over their own personal environment, particularly that they treasure a lot of their personal belongings, possessions, toys and books etc. They opined that with reasons like *'such things are lovely'*, *'it is enjoyable'* and *'we needed it'*. Secondary students on the other hand expressed greater concern over the treasure of the natural environment, in particular the natural landscape features such as the sunshine, the beach, the coast, the waterway and so on. Primary and junior secondary students treasure more about animals and plants in the natural world. Table 3 summarizes the distribution of concerns of the students over the first two positive questions about things they treasure most and that they regard as important.

Table 3: Summary of the students's positive concerns.

| **Upper Primary** | | | | **Junior Secondary** | | | | **Senior Secondary** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Question 1 | | Question 2 | | Question 1 | | Question 2 | | Question 1 | | Question 2 | |
| code | % | code | % | code | % | code | % | code | % | code | % |
| Ps | 34.5 | Ps | 18.0 | Ps | 1.5 | Ps | / | Ps | 6.5 | Ps | 2.5 |
| Pp | 12.5 | Pp | 3.0 | Pp | 1.5 | Pp | / | Pp | / | Pp | / |
| Pf | 3.0 | Pf | 3.0 | Pf | 1.5 | Pf | 1.5 | Pf | / | Pf | / |
| Na | 11.0 | Na | 10.0 | Na | 25.5 | Na | 20.0 | Na | 11.0 | Na | 19.0 |
| Np | 20.5 | Np | 23.0 | Np | 25.5 | Np | 27.5 | Np | 20.0 | Np | 11.0 |
| Nf | 17.0 | Nf | 24.5 | Nf | 41.5 | Nf | 42.5 | Nf | 59.0 | Nf | 48.5 |
| misc | 1.5 | misc | 18.5 | misc | 3.0 | misc | 8.5 | misc | 10.0 | misc | 19.0 |
| total | 100 | total | 100 | total | 100 | total | 100 | total | 100 | total | total |

Some of their reasons given by the primary students as to why they treasure certain things are given below. It is noted that they mainly express their personal love, trust and preference to themselves, their family members and friends. Most of the reasons are rhetorical and indicate the children's intuitive and egocentric preference without a very strong environmental or social reason to explain for it.

| | |
|---|---|
| Ps | *I love my turtle and it is of value to me because she is part of my family.*<br>*I treasure very much a doll. My sister and I made at my Grandmother's . It is full of flowers.*<br>*I treasure the doll because its beautiful, and I'm proud of it because I helped to make it.* |
| Pp | *I love my family because there is a special part of me.*<br>*If I did not have family, I would be sad and have no one to talk to.* |

Pf *I love my friends because I trust them.*

*I treasure my friends and family and my dog because they are important to me and I love them.*

Np *I treasure rainforests and bushlands. I think that a lot more children need to get outside and not watch television so much.*

Np/Nf *I treasure the rainforests with their crystal clear waters because they are the most beautiful and peaceful places on this earth.*

*Without trees and flowers, we would all die without oxygen. And if we had no flowers, there would be no colour and life.*

Na *I love and want to protect all the animals in this world and want them to be safe so that generations to come can see them.*

*I treasure the wildlife and there is so much to learn about animals but people are not taking enough care of them.*

It is interesting to note an almost identical expression of concern towards the natural environment such as rainforest, bushland, animals, wildlife and particular places of interest (such as Kakadu National Park, Great Barrier Reef, Daisy Hill Forest) from the junior secondary students. This reflects that they begin to care about things other than themselves. Yet these things are usually things that they have seen, places that they have visited and where they can easily attach their feelings to them. Though they still suggested simple reasons like *'I love them'*, *'They are cute'*, *'They are beautiful'*, the teaching in school apparently has enriched their knowledge about the importance of such things as forest, wildlife and bushlands and hence they know they have to treasure them on equal right basis. Below are some of their reasons given by the junior secondary students as to why they treasure certain things.

Np *I treasure trees because they eliminate carbon dioxide and produce oxygen. Trees also give shade and provide homes for animals.*

*If we did not have trees we would not be able to breathe and if we could not breathe, we could not live. Trees purify the air around us.*

Na *I treasure wildlife animals because animals are nice and never should be killed or mistreated.*

*I treasure animals because they are just as important and I love animals.*

Nf *I treasure Great Barrier Reef. It is a very beautiful part of Australia. It also provides a home for many different species.*

*Kakadu National Park. I have been there. The best place in the world.*

*I like the Botanic Gardens because flowers and trees by the waterside is a nice scene to see.*

When it comes to the senior secondary students, they resemble a similar preference towards the natural world in terms of the waterways, the air, the clear blue sky, mountain and ocean etc. while they also play due concerns to the flora and fauna. The reasons for their concern is similar to the junior secondary students except that there begins to emerge a few more abstract philosophical comments. They are listed below:

Na *I treasure the animals because they are innocent. They live in accordance with their environment, do not destroy their environment intentionally as humans do.*

Np *I treasure plant life, particularly how various plans adapt to climatic conditions. Without them, everything on earth would not exist.*

Nf *I treasure the clean waterways. The pollution of one person shouldn't inhabit others. Clean water ways make it better for any water activities and safer.*

**Things that annoy, worry and the students would like to change if given the power**

The findings of this part reveal a drastic change of students' concerns from the natural environment to the social environment ranging from their immediate neighbourhood and community to the general society, to the country and eventually to the global world. They all particularly worry more about the problems of global nature. While this is the general pattern of concerns across the three groups of students, it is found that both junior and senior secondary students want to change their immediate social community environment first, despite the worry and annoyance with things that happen to the general society and the country. This probably reflects that they want to propose change in a more feasible and workable way within their power and effort. Table 4 summarises the responses of the three groups of students in the negative area.

Table 4: Summary of the students' negative concerns (all in percentage)

| code | Question 3 | | | Question 4 | | | Question 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| | primary | junior | senior | primary | junior | senior | primary | junior | senior |
| N | 26 | 20.0 | 8.5 | 21.0 | 13.0 | 6.0 | 24.0 | 11.5 | 2.5 |
| P | 10 | 1.5 | 3.0 | / | 4.5 | 3.0 | 2.5 | / | / |
| Sc | 18 | 41.0 | 43.0 | 17.5 | 37.5 | 36.5 | 8.0 | 20.0 | 10.5 |
| Ss | 16 | 12.0 | 8.5 | 23.0 | 7.0 | 18.5 | 21.0 | 11.5 | 2.5 |
| Sn | 18 | 21.5 | 28.5 | 13.5 | 22.0 | 24.0 | 10.5 | 22.0 | 18.5 |
| Sg | 12 | 4.0 | 8.5 | 25.0 | 16.0 | 12.0 | 34.0 | 35.0 | 66.0 |
| total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Some of the distinctive concerns expressed by the students are listed below with our interpretations.

Sc *If I had the power, I would pull down the old rotty tatty homes and make new ones because we can use the wood and bricks or what ever to make people brand new houses and that they won't look like a dump.*

(This junior secondary student concerned about the shabby housing appearance of the community and decided to rebuild the houses to uplift the mood of the whole neighbourhood. However, she had recycling and re-using of materials in her mind and she hinted for a healthy pleasant housing living environment. On the other hand, there is doubt whether the situation she was taking of has any concept of heritage values.)

Ss *I worry about poverty as people should be able to live a life with food and nice surroundings like trees and clean creeks.*

(This junior secondary girl had equity and human rights in her mind and she considered everybody should have a fair go and chance to live a descent life and enjoy the beauty of the nature.)

Sn *I get annoyed with the politicalisation of environmentalism because people seem concerned not with actually doing something but scoring political points. Radical ideas are often put forward by environmental pressure groups. However, it is not possible to consider only the environment when making decisions. It is only part of the equation, economic and social aspects are important aspects too.*

(This senior secondary boy obviously disliked the overall social environment of the country as constantly dominated by political voices of one side. He also expressed dislike that people play political games by pushing one side of the story without considering the overall picture. He was trying to draw attention to the politicians who should represent the whole country to have a fair go in decision making in relation to the social and natural environment.

Sg *I feel annoyed about the nuclear waste because its radio activity could cause major destruction to the environment. I worry about the French Nuclear testing because some marine organisms are mutating unnaturally.*

(This primary boy had some superficial knowledge about radio activity and heard about how mutation causes un-natural growth of living things. Apparently, this particular issue has become his concern due to the broad coverage by the mass media.)

## CONCLUSION:

As has been indicated in the earlier part of this paper, only objective 1 of the study was reported here. The overall picture of the sixty-nine students's environmental concerns and how they have opined to such a concern can not be fully established until the in-depth focus group discussion data are available. However, the elementary findings from the coding data reveal a gradual strengthening and deepening of the children's concern towards the environment from self-centre to the society and eventually to the world. More philosophical and scientific reasons were used to substantiate their like and dislike towards the environment. Purely relying on personal intuition to justify an environmental preference appears to be less obvious as the children get older in age. Things that become their foci of concern also expand with distance from the immediate environment.

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# Green Stories: The Experience of Environmental Commitment

**Denis Mahony**
**The University of Newcastle**

## ABSTRACT

This paper relates eight environmental stories. The first is my own, the other seven are drawn from 67 in-depth interviews conducted during two research projects which investigated the nature of environmental knowing. All of the selected interviewees were committed environmentalists. The intention is to take note of what this experiential knowledge has to offer, and to reflect on its contribution to discussions concerning environmental ideology, paradigm shift, and environmental education. Two areas of importance can be emphasised: the stories provide real examples of environmentalism in day-to-day action; and illustrate the value of experiential - as opposed to 'expert' - knowing.

## INTRODUCTION: TELLING OUR STORIES

The founders of environmental education have been depicted as searching for "the one true story" about the definitions and learning models appropriate for the emerging discipline (Greenall Gough 1993, 36). Three decades on this story telling about the discipline continues, but with a heady mix of heightened moral imperative and increasingly polarised narratives. In research this may be represented as a debate (Robottom & Hart 1993), while in education the moral imperative may come from a perceived 'ecocrisis' threat (eg Bowen 1989; Recher 1989), and the polarisation concern the most effective approach to pedagogy (eg Hungerford & Volk 1990; Fien 1993; Gough 1987).

But another view is that environmental education is about acknowledging our personal stories. Cheney believes the task in environmental ethics is "to tell the best stories we can...about our, and our community's 'storied residence' in place" (Cheney 1989, 133). The significant body of literature dealing with ideology and paradigm shift (eg Dominant Social Paradigm vs New Environmental Paradigm; Light Greens vs Red/Deep Greens) suggests that environmental education is ultimately about accessing, and making more compassionate, our personal values and beliefs concerning the natural world.

As I pursued my reading in this area I found myself particularly drawn to key ideas dealing with subjectivity (Peshkin 1988, Heshusius 1994). I was particularly interested in the potential of Dudley's 'paradigm shift' (1987,1994) and Tripp's 'critical incident' (1994) to break through that cultural conditioning that hinders us from recognising and engaging our personal environmental ideologies. When I became aware of such a critical incident in my own life, I decided to attempt some subjective research.

By keeping a reflective diary, I discovered a previously unrecognised shift in my own environmental position, towards the deep green pole. The research proved to be unexpectedly confrontational with regard to my community relationships; to the manner in which I had compartmentalised my professional and private lives; and to my detached, 'objective' writing style (hence this change to writing in the first person, active voice).

The first story that I will refer to is my own account of this critical incident experience. It is a matter of credibility to me as an environmental educator that I do not speak to others about value and behaviour change while holding my own life world sacrosanct. The other twelve stories are selected from two qualitative studies into the nature of environmental knowing, using ethnographic evaluation as my research methodology (Fetterman 1989), with the ethnography seeking undisturbed 'insider information', and the subsequent evaluation applying the findings to the environmental education context. I carried out two studies in this manner, taking six and two years respectively, seeking to illuminate how adult rural communities understand the natural world per se (the Wollombi Valley study [Mahony 1995]), and then how this responds to the assertion of a contrary way of knowing - in this instance, to find a 'participatory' solution to a water quality problem (the Williams River study [in press]).

While conducting the in-depth interviews in these studies, it became obvious to me that some of my subjects had a commitment to environmental values which positioned them at the Deep Green end of the environmental ideology scale. Since my research focus at the time was different, I decided to re-visit these ethnographies as Green Stories.

## THE GREEN STORIES

### 1. DENIS: A CRITICAL INCIDENT

The critical incident I am about to relate concerns several months of logging activity on a private property in forested sandstone country about two kilometres away from our house.

In early June I had two casual meetings with a guy driving a typical country Toyota utility. He told me he was a private logging contractor who was going to cut timber on neighbour C's property, and we chatted about his contracts for woodchop competitions, cartage jobs and bulldozing.

In late June during one of my occasional walks through the forest, I passed through neighbour C's property and suddenly came upon a valley where a former undisturbed forest was now replaced by scores of fallen eucalypts. Most were mature trees, up to two metres in diameter, though many smaller trees had been knocked down by the falling giants or by the bulldozer. The latter was still there surrounded by a network of tracks gouged out of the valley. Some logs had been cut out with a chainsaw, but for the most part the bulk of the fallen trees lay as they fell. To me it was a scene of utter devastation, for which I was completely unprepared, made more poignant by the silence that now enveloped it. It was as if I had stumbled upon a massacre site, prompting feelings of shock mingled with anger and a great sadness.

On a Sunday afternoon in mid July, I met neighbours C (husband and wife) on the dirt road joining our properties and within a few minutes we were joined by the logging contractor. Despite having been on friendly terms with them for a decade, I was received coolly, and before long the conversation became confrontational. They argued that the timber was being put to good use; that the forest would quickly regenerate; that it was an economic necessity; and that as owners, they had the right to do as they chose on their own land. I despaired of ever conveying to my neighbours and the logging contractor, the feelings of shock, sadness and anger I felt when I looked at what they had done. It was as though we spoke different languages, and came from different places.

During the rest of that month, I phoned or visited various people with expertise in, or responsibility for environmental protection. It appeared that the land logged was Protected Land, under the Soil Conservation Act and also required Development Consent from Local Government. As a result, the logging site was visited by both a Protected Lands Officer and a Council Ordinance Officer.

In early August I was horse riding with my 12 year old daughter when we met the logging contractor, his father and another timber worker. The first two were very angry and verbally attacked me for my actions. I too became angry, and a hostile exchange took place. I am normally of a conciliatory nature, but I left this encounter with the feeling that this issue was forcing me to make a stand: what they called 'logging' I saw as maiming a living forest community. I could not at the same time be friends with the loggers and friends of the forest.

It seemed to me that the process was now one of building support for polarised positions. I heard that the loggers were spending time in the Village Tavern every day, where they were vociferous in their condemnation of those "idiots" in our Valley. For my part, the Council Ordinance Officer phoned to say that Council intended to prosecute neighbours C and that he may require a statement from me by way of evidence. I spoke to the local Landcare Group and moved a motion that Landcare undertake an education programme, via a mailout, to inform landowners of their legal responsibilities and rights concerning logging activities. During September I arranged individual and collective meetings with the government agencies concerned with environmental protection to obtain their input into a 'Legal Responsibilities of Landowners' document, as approved by Landcare.

Logging activity ceased in our valley in October. During the next four months I presented a draft copy of the 'Legal Responsibilities of Landowners' to three meetings of Landcare. Funding was obtained to cover printing

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and postage. However the project's momentum was halted when an unsolicited legal opinion was offered to Landcare, warning against possible liability resulting from the promotion of the Landcare document. The Landcare membership now urged caution and put the project on hold subject to further legal opinions being obtained. I formed the impression that Landcare was unwilling to attempt this particular obstacle, and I felt disillusioned and angry at what I saw as a pusillanimous rejection of its core charter to stand up for the land.

Reflecting upon the events of this ten month period is like observing the behaviour of someone else. Is the person revealed here as alarmed, confrontational and intolerant really me? What is the source of these feelings and behaviours? The experience proved far more complex and confronting than I had anticipated. The logging incident made me sort out my personal values and make some hard choices concerning friendship, priorities and social interaction. It left me with a strange mix of disillusionment and satisfaction. The first is to do with leaving the luxury of grand ideas about human-nature relationships, and finding that the world of doing in this regard, assaults my comfortable, non-committed existence and is hard work all the way. But I also have a distinct sense of relief and a good feeling at having declared myself.

### 2. ELAINE: MAKING HER STAND

Elaine lives on a property situated on a ridge accessible only by a rough track. Her house does not have mains power and the property does not graze cattle. Her childhood bonding with the Wollombi Brook is a recurring theme in her conversation and a continuing imperative in her life. *I choose to live here because I spent my childhood here and because there is something about this Valley ... it's a strange business ... what it is. It's like a magnet.*

She sees herself as part of nature and thinks that **cattle are a major problem**. *The native vegetation was cleared to provide grazing land, their sharp hooves both erode the creek banks and compress the other ground preventing the regeneration of native vegetation.* Traditional graziers *have a bank account mentality* and are possessive, suspicious and threatened, *sitting out there with their minds closed.* She sees the environmental problem is critical and urgent. *I don't think we've got time to fix it.*

Elaine has made a personal stand against such evils, *just by being here, not being in the city and trying to be self sufficient.* She has campaigned vigorously for the things she believes in, such as the cessation of sandmining, the granting of local land right claims to Aboriginal people and the establishment of Landcare in the Valley. She rejects the comforts brought by mains electricity. *They want to cut down 30 metres of trees. That's outrageous.*

### 3. MIKE: DRAWN TO THE BUSH

Mike lives on what is mostly steep gullies and tall trees. The house is constructed of 15 cm ironbark slabs and has a shingle roof. There is no mains power and for the first six months the family had to carry their own water.

Mike feels strongly drawn to the bush. He grew up there but left to pursue a career. It took him a long time to realize the pull of the country. *I ignored the bush for so long, I lived in cities all over the world. In 1976 I started coming back to the bush again and I just realized that that's where I was happiest. I've always felt since, when I've gone back to the city, like a square peg in a round hole.*

He worked for many years for multi-national corporations until he became disillusioned. He says of the last one - a finance group - *it seemed such an ideal to me ... until I realized it was motivated by greed (and) greedy salesmen. When it went bust I swore that I'd never have anything to do with a corporation ever again ... Since then I've been into 130 different jobs.*

He has developed a strong kinship with the land. The real criteria for land use is what's good for the country. Old time farmers are not really in tune with the land, they know how to use it to **their** best advantage, but not to **its** best advantage. Mike is now personally protective of the land. He has not and will not clear any more of his 100 acres. He loves to see the wallabies graze near his house and keeps the wild dogs off. He wouldn't kill a black snake at all and would only have a go at a brown snake if it was threatening the house area. He'd prefer to try and shoo it away. Likewise with the goannas.

He has strong feelings about cattle. *I don't like cattle, don't believe in them. The world would be a better place without cattle. I don't think we need them. We should be eating kangaroos, birds, chickens .... We just grow them to kill them and eat them (but) there's no Animal Liberationists standing up and saying why do we kill cattle?*

Mike's belief is that we should live off the resources "that are natural to the country" such as Aboriginal people did before white settlement. He does believe gardening is appropriate for the country, provided it is not "corporate", massive scale gardening, eg cotton farming.

Gardening, and country living could be the therapy to rescue people from the malaise we suffer from today. *It really disappoints me, Australia as a nation of people ... self respect has been stripped from us by over bureaucratizing, over legislating, over taxing, over policing.*

Being more down to earth can involve reactivating primeval powers such as Aboriginal people have, eg*their incredible power of telepathy whereby they know instantly when someone dear is in trouble or has died even through they are far distant.*

## 4. SALLY: PASSIONATE CONCERN FOR THE ENVIRONMENT

Sally lives on a property close to a village. About half the property is forested hillside and it has a brook frontage of a little more than 100 metres. Sally moved into the area from Sydney in 1984.

Sally has strong views and passionate concerns about the environment. She attributes these partly to her upbringing "in quite a left-thinking family". She went to a private school which encouraged individual responsibility. Her father was a professional man who unsuccessfully attempted market gardening. Here Sally says, *I got my images of the countryside and so I've always wanted to be on the land - and to be as self sufficient as possible.* Sally also acknowledges the influence of the past hippy era and believes the country is a healthy place to bring up children.

While Sally feels comfortable living among the Wollombi community, she has deep concerns about the problems confronting them and their capacity to deal with these. Chemicals are a major problem. She has protested personally to Council over the use of herbicides to control Salvinia. She would like to see all property owners with roadside frontages oppose Council's roadside spraying programme. Superphosphate too should be avoided.

All the waterholes in her section of the Wollombi have filled up with sand. Sally sees this as the consequence of 200 years of cultivation and clearing. She is concerned about the welfare of native animals and thinks that wombats are unfairly blamed for stream bank erosion. Domestic and feral animals are a real menace. But these are really only local manifestations of a global environmental threat. *I think the planet is in such dire straits .... We're probably the last generation, unless something radical happens, to have enjoyed the luxury of clean air and water. I really don't want to bring any more children into the world the way it is.*

She is frustrated at the "Anglo-Saxon narrow-mindedness" of the older farmers. *Half of them never went to school beyond 12, they read* ***The Land*** *newspaper, listen to conservative Stock and Station people and have been strongly conditioned by a family mythology.* Just as intractable are the bureaucracies. *I can't believe how long these ideas take to go down through the bureaucracies. We all know the planet is dying through the use of chemicals and poor management. We're all being slowly poisoned and yet Local Government won't change their policy for another ten years until some vision and legislation filters down - or up.*

While people may be an unknown factor, Sally has no ambivalence about her feelings for nature. She can't bear to see a dead wombat. she hates the damage done by dogs and cats. She thinks it's wonderful when it floods. *I just love living in the elements and being affected by the elements.*

## 5. GREGORY AND SANDRA: ODD ONES OUT

Gregory and Sandra live on mostly steep and bush covered land. They live in a simple cottage and only utilize the land to graze their four riding horses and grow their own vegetables, when water supplies permit.

Their decision to buy a property adjacent to National Parks and wilderness areas was almost forced upon them by the progressive closing off of opportunities to indulge in their passion for camping. They still go camping and bushwalking, to breathe the fresh air, watch the birds and animals, and to "get away from it all". They are generally appreciative and protective of native animals. They condemn the wanton shooting of wedgetail eagles by farmers and do not mind grain-devouring flocks of cockatoos can find safe haven on their property. They have never found snakes aggressive and Gregory admits he would find it difficult to shoot even a fox or feral cat. Both Gregory and Sandra have a strong interest in Aboriginal artifacts and have found many sites in their travels.

They have mixed feelings about the National Parks and Wildlife Service. Sandra cannot understand why they choose to do hazard reduction burning towards the beginning of Spring when they will destroy young birds in their nests. Given their long-held love of the land, it is not surprising that they are unhappy about activities perceived as hostile to the environment, especially trail bikes, coal mining and Army artillery. Off road racing is strongly opposed. Gregory sees other examples of lack of environmental responsibility. Timber getters are unable to resist the opportunity to take out trees regardless of their effects on the ecosystem. *It's the quick buck syndrome ... it's greed, nothing else.*

The end result for this couple in this community is a sense of alienation. Gregory and Sandra allude to this many times, using such expressions as "odd man out, clash of interests, different cultures, opposing poles". For the most part they are philosophical about this: *We knew that before we moved up here, that there will be a clash of interests. There's no way you'll be on the same wavelength. so you just don't touch those certain subjects at all. Apart from that, you live next to each other. There's no dialogue going on. Their philosophy, they're not reading the same things we do or listening to the same radio, but don't have anything in common there.*

They adjust to the differences using tolerance, sensitivity and humour. But there is also bewilderment, that people can be so fundamentally different.

### 6. MARY: SHARING WITH THE ANIMALS

Mary lives on a property on a tributary of the Wollombi Brook. She lived in Sydney all her life and went to the seaside every day. But by 1980 the coast had become so dirty that she was not able to use it, so she and her husband decided to look for some land. They found it quite by accident. *It's quite extraordinary. It seemed to me almost that we were meant to have it because we didn't look at anything else. We just saw it and liked it.*

Mary had definite ideas about land use. *We wanted to live here but we didn't want a farm. We didn't want to put up fences. We just wanted to make a minimal contact with the land. We never would have destroyed anything. We just wanted to live there without chasing away the animals or putting domestic animals up there.*

For Mary her place is now a place where she can enjoy the beauty of nature and be with the native animals and plants. She talks of two influences in explaining how she came to this understanding of nature. The first is her attachment to animals. *I've got an intense feeling that we're meant to share the land with the animals. I really believe that. I suppose we are the superior species but we shouldn't dominate to the extent that our lives mean that the other animals on the earth can't live their lives. I'm really serious about that.*

The second influence was a growing conviction that people were becoming too greedy. *When I was 20 I began to think seriously about this and that's when I became a vegetarian because the cruelty of food production worried me a lot. I couldn't live with my conscience when I knew what went on. People began to get too greedy and put hens in batteries and cattle in feed lots and so on.*

Mary sees herself as part of the animal world and feels so passionately about their needs to make a stand. She is replanting trees in the bare valley floors, providing a secure habitat for native animals near her home, has caused Council to erect warning signs on local roads to protect wombats, and is campaigning to restore suitable habitats for koalas

### 7. COL: PROTECTOR OF NATIVE FISH

Col is President of a Native Fish group (made up of about 40 members), which he co-founded some fourteen years ago. He describes the members of Native Fish as 'average Joes' who like their fishing. All of them fish on a 'catch and return' basis or restrict themselves to a bag of two fish. But the members are also eager to protect Australian Bass, as well as Yellow Belly, Golden Perch, Silver Perch and Murray Cod.

Col has a quiet but distinct sense of mission about his work for Australian native fish, which, he sees as part of his love for nature as a whole. He reflects on how he first came to be involved:

At times this can develop into an intuitive understanding: *I used to work in Maitland, and, because the punts ran on Stockton in those days, I used to go out through Tomago to go home. And just the northern end of Tomago Road there, at Tomago House they'd rooted out a whole row of big fir trees. I was disgusted. A few weeks after, we were up around the Wilson's River and Bolongs Plains way, and we came across this huge paddock. They'd* *got the chains on the bull-dozers, they'd up-rooted everything and just burnt the lot, and I thought, what a waste. I could not get over it and sub-consciously I think that's where I started off.*

Since then he has found that the river is his best teacher. He has been deeply moved by the grandeur of the scenery and in the long hours quietly spent in a canoe he has attuned his senses to the way the river lives. *Sometimes I've fished a hole for four or five years and done remarkably well, and all of a sudden I go up there and there's nothing. Even the birds have gone, and the lizards (the water dragons), and you look in the water and you think something's happened. You can usually tell when a hole is dead. There is something about it.*

The ecology of the river has been radically altered by the construction of Seaham Weir. *But you stop the flow of a river, I mean, it alters everything.* He is happy to contribute his knowledge in his own quiet way. *I mean, you drop a hint somewhere and somebody takes it up and runs with it a bit later ....you sow a seed and it may grow.*

### 8. KEVIN & MARTHA: WISHING TO BE GREEN

Kevin and Martha's forested property backs onto extensive state forest and is the eastern most ridge of the Barrington mountain range. They effectively use only about 20 acres and have good feelings about not making any demands upon the remainder.

In the fifteen years they have lived there, Kevin and Martha have came to know more about the forest trees and the variety of fauna that live there. They welcome a number into their house, like Huntsman spiders and Ghechos and worry about their decision to remove others that have become a nuisance in one way or another - possums, goannas and a diamond python snake. They see themselves as caretakers of communities whose needs they have come to appreciate, and have become very concerned about the invasion of these communities by ignorant new settlers, and government agencies with their own agendas.

The Department of Forestry is an example of an agency with a narrow ecological vision. *They come in, they make a terrible mess, and they're there for a short period of time and they're gone. They'll damage a certain number of trees that have holes in them, which are nesting spots for birds, possums, whatever. They knock a certain amount of canopy down, which lets in lantana. They let in a lower storey that they have no interest in but they have no control over. They do a little soil conservation damage, in that any logging track is going to be a wet weather wash.*

A distressing instance occurred when a fire came along the ridge towards the property and the Fire Brigade came in and dealt with it. They did by means of a fierce back-burning operation. This Brigade-lit fire had a profound effect upon this family who saw themselves as protectors of the forest: *The fire was horrendous in terms of everything. We listened to hundreds of trees falling over the fortnight, that just were weakened and fell. It just opened forest and just destroyed the environment. They didn't actually care what happened to the fire in the forest, it had to be stopped there, and everything that could be burnt in the forest, had to be burnt. Because there was to be no risk of a possible progression, they burn away, everything, and the state sent enormous bull-dozers, they just drove straight up the ridges with. Soil conservationists would have shot the bull-dozer driver.*

Kevin and Martha are very reflective about these experiences. They recognise that fighters and forestry employers are well intentioned, but that organisations have an instrumental view of the forest environment and define it according to their own priorities.

While, recognising that they are seen as 'green' by the community in which they live, Kevin and Martha see the term as problematic. They wish to be green, do green things and make green choices, but all in the context of capitalist, consumer life style. In fact a very difficult ideal and the reality is more to do with the process than achieving impossible end result.

### THINKING ABOUT THE STORIES

It is obvious that these stories have elements in common, to do with confronting mainstream values (about farming, 'business' and government for instance) and accepting a 'keeper of nature' role. My educational training prompts me to pursue this, and indeed I have done this already in my Wollombi research, categorising such individuals as 'Earth People', characterised by particular value positions, cognitive styles, ways of communicating and character traits (Mahony 1995). Dudley has also done this for the paradigm shift experience itself, identifying seven themes as "embodying the essence of the phenomenon" (Dudley 1992, 327).

My reason for resisting this is epistemological. My automatic reaching for a reductionist, conceptual and empirical methodology illustrates the prevailing 'expert' way of knowing, which Eisner describes as "the tacit but widely held belief that there is only one dependable way to know, something vaguely called 'the scientific method' ... that one epistemology fits all" (1990, 89). But story telling comes out of a 'personal' way of knowing that is holistic and experiential, and which is derived from an intimate relationship between knower and subject (Lumby 1991; Heshusius 1994). Such knowledge is also referred to as intuitive, i.e. it is gained without formal reasoning, and so it is difficult for the knower to articulate the process. While personal knowledge is recognised in nursing (Lumby 1991; Street 1992) and social research (Mackay 1993) it has failed to achieve real status in environmental education, even though its importance is clearly implied in the attention paid to earth education and environmental ideologies.

Telling my story is a personal revelation of where I am. Listening to another's story is a phenomenological matter, seeking to understand a reality *as it exists*, and requiring me to understand *with* the person, rather than *about* the person. From this perspective, sharing stories of our attempts to renew our ancient and archetypal relationship with nature (Sheldrake 1990; Tacey 1995) is a form of environmental education that is empowering and communal, and one which inevitably challenges us to reconsider our ontology and ethics, as well as our epistemology.

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# (Re)constructing environmental popular knowledge, reclaiming silenced voices.

by
Dr Karen Malone
Faculty of Education Deakin University, Geelong, VIC 3217

## Introduction

Few doubt the seriousness of the environmental threat that faces our earth. From pole to pole, the growth of industrialism and the demands it stimulates are destroying the environment and undermining the livelihoods of millions in the interests of a small minority. By polluting the atmosphere, depeleting stratospheric ozone and accumulating greenhouse gases, industrial activity is destablising the global climate to a point where severe global warming appears unavoidable. We have separated ourselves from nature and we now seek to control, manipulate and destroy the very ecosystem that sustains our lives. It seems nothing more than madness that we now use air, water and soil -- the very support systems for all life on earth -- as a sewer for our industrial waste. These industries have taken pride of place along our waterways and oceans, conveniently located for excretion. Alongside this environmental destruction is the increasing impoverishment of the earth's people. Those who lives and local environment have become degraded and devalued by the pursuit of short-term economic gain. At the root of these issues are questions of power and privilege and the realisation that we can't solve any environmental problem without revealing fundamental power imbalances and changing them.

As you drive into the western suburbs of Melbourne there is an acrid smell that pervades the air, the sort of smell that sits at the back of your throat and makes you want to cough. Cars, trucks and industry dominate the landscape and while you rub your eyes because those fumes are now invading your tear ducts you start to realise you're getting a bad headache ...

This paper is a discussion on a research project undertaken in a small urban working class community who were disillusioned by the local authorities inability to address their social and environmental concerns. Taking what was once a degraded and disused area of public open space members of the community combined forces to bring about dramatic changes to their social and natural environment. This project, although concerned with providing a recreational area for community use, was more than a revegetation program it was an opportunity for local residents to expose the injustices of their position of powerlessness and demand their rights to a safe, clean and accessible environment. In this paper I will focus on the approach adopted by the local community to change this balance of power -- to expose the false illusions created by them that have hindered their capacity to be agents of change. Through sharing stories and constructing dialogues grounded in their own lived experiences the community proposed to articulate the grievances of the group and provide a discourse by which their situation could be (re)conceptualised. It was an educative approach which sought to empower the community to conceive themselves and their situation differently. Or, as one local resident put it:

> ... this project [at Laverton Park] is about people. People getting out of their homes and working for a common goal. We can't do it by talking in committees, we need to have support of the local people, people who understand and know about the area, what their needs are, what they want, not what the bureaucrats want for us...

The goal of the critical project was to name the silenced and give them a voice.

## Laverton Park: reclaiming a community voice

The site of the research project was Laverton Park. Laverton Park is a small housing commission estate developed in the early 1960s to service officers and their families stationed at the Laverton Royal Air Force (RAAF) base. The RAAF has since relocated its officer accommodation to nearby Hoppers Crossing and what remains is affordable housing for low income families, the unemployed and ethnic populations.

Laverton Park is a small island of humanity in a sea of industry and freeways. The housing estate is seven hundred and seventy-eight hectares in total. It is bordered on all fronts by built environments that serve as physical and social barriers isolating it from local community facilities and recreational areas. Along its northern and north-eastern boundaries the estate has a fast train line and a six lane freeway. On the southern and western boundaries of the estate the land is occupied by the RAAF base. The RAAF use these large areas of open space for training and as a buffer zone. These areas of open space are not accessible to local residents. To the north of the estate is the site of the Laverton North offensive industries zone. These industries attract a persistent flow of trucks and car traffic to the area. They also contribute considerably to visual, noise and air pollution. The area has few parks or playgrounds with the only substantial area of public open space being McCormack Park. The following diagram gives an overview of the goegraphical location of Laverton Park housing comission estate.

An average street in Laverton Park consists of a bitumen road with concrete footpaths running either side. Between the roadway and the footpaths are 'nature strips', these are narrow strips of often unkempt grass. On occasions a bombed out car or household goods can be found scattered along the nature strip or roadways. The front fences of the houses are typically low and made from brick, serving as demarcation lines rather then keeping anything in or out. Low fences also run between the houses. The front gardens of the houses are typically lawn with an occasional garden bed or tree. A concrete driveway runs along the side of the house into the backyard. The houses are either of prefab concrete blocks or brick veneer. As with most housing commission estates built during the 1960s there is little diversity in the housing style.

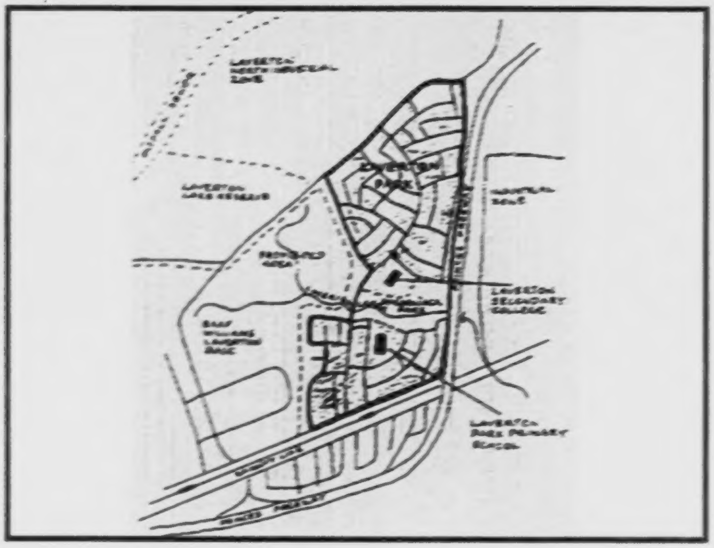

**Diagram 1** Laverton Park Housing Commission Estate

Laverton Park has the reputation of being a lower socio-economic area as illlustrated by the past Principal of the Laverton Park Primary School when he stated: "The profile of our school would be say eighty to eighty-five per cent of the school population are eligible for some kind of maintenance social security benefit in some way" (Interview with Principal of Laverton Park Primary School, Oct1993). Information obtained from the 1991 Bureau of Statistics census reveals that 66% of the population in Laverton Park have no formal education qualifications, 48% left school at sixteen or earlier, 90% of employed residents are wage/salary earners, 60% earn less than $25 000pa and 35% speak other than English at home. The estate has a reputation for high instances of petty crime, vandalism and drug trafficking.

The unique geographical features of the entire western plains region (within which Laverton Park is located) have made it a targeted site for a large number of offensive industries. These industries who through employment and land rates contribute significantly to the local and state economy have slowly infiltrated into the residential areas and as a consequence of decreasing buffer zones and increased populations have substantial impact on local communities. Comments by Local residents have supported these claims:

> "It is a bit late; we are surrounded by industry polluting all the area so bad that children occasionally come home from school with hands on their mouths to try to breathe"
> "Living close to industry can become very depressing, especially on windless nights when the stench of industrial fumes permeate the air"

Alongside of the immediate environmental problems presented by industries located beside residential housing is the issue of image and stigma that living in the area has for local people:

> The image of the west as a working class, poorer area of Melbourne has stood out as a major problem in the area. What may be described as the 'deprived west syndrome' appears for some people as a reality, and is said to be evidenced by the lack of appropriate services, or lack of clout to change their current situation; for others it is a name only, it is more how others regard the west. Concerns about social stigma associated with public housing estates, and areas with concentrations of lower socio-economic groups were also expressed. (Department of Planning 1983: 51)

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Other concerns about quality of life in the west have been centred on the lack of facilities and parklands and the sporadic maintenance of existing areas. A study of the Laverton area revealed that although there are a large expanses of vacant land owned by the government or industry they had lain idle for years, become an eyesore and provided little if any benefit to local communities for recreational use. Even the areas put aside for recreational use were predominantly of a sparse 'open nature' containing little or no vegetation. McCormack Park was one of these neglected areas of open space and became the focus of the environmental education program at Laverton Park.

The Let Laverton Creek Live Committee started as a spin off from the socially critical community based environmental education program at the local primary school. The environmental education program at the school was established as the means for instiling a sense of pride and ownership of the local environment in the children and local residents. The program was based on the conjecture that by providing a number of opportunities for community members to share their experiences, identify the source of their grievances and be active in planning for the redevelopment of the local park it would reveal to the community the source of their disempowerment and engender a spirit of solidarity through critical consciousness. The Principal at the local primary school expressed these notions in the following terms:

> It was about developing a system of values for life -- that you have the right and ability to change your world, change your society, that you can influence it. A lot of people from this community don't believe they have the ability or right to do that. We're trying to set up something where the community would in every real sense own it and make it, would drive it and lead it to wherever it goes -- **empowering** people to change society. (Interview with school Principal, October 1993)

The environmental focus of the committee was McCormack Park. Once the local tip McCormack Park was reclaimed over thirty years ago as a storm water overflow. The water was highly polluted due to run off from industries located along its courseway and was choked up with weeds and airborne litter. The surrounding parkland, described by the Land Managers as "a paddock of scotch thistle" was a haven for snakes and trashed cars and presented many dangers for young children who used it as their only area of recreational space. Until the introduction of the environmental education program attempts to redevelop the park by the Land Managers had been thwarted by large scale incidents of vandalism. Local children and residents described these incidents of vandalism as due to a lack of consultation and ownership: "they decided what we wanted, got some publicity for their organisation then let the park go back to its degraded state". Much of the anger and frustration of the community was expressed through vandalism and aimed specifically at the Land Managers who were positioned as the 'authorities'. The Land Managers in contrast interpreted the negative actions as a lack of respect or value for the environment.

### A theoretical framework for analysis

To interpret the approach taken by the Laverton Park I constructed a framework based on participatory research, because as Park (1993: 3) states:

> Participatory research provides a framework in which people seeking to overcome oppressive situations can come to understand the social forces in operation and gain strength in collective action.

The theoretical framework was developed through the utilisation of a number of key principles and theoretical presuppositions presented in the literature on participatory research and critical theory.

Participatory research has been presented as an alternative form of inquiry developed to counteract the oppressive nature of dominant research methodologies that treated participants as objects of manipulation in the research process (Tandon 1988). A participatory research approach to environmental activism therefore supports the ideal that communities are the best agents for determining what the needs of the community are, setting goals for change and organising a process of collective action to achieve these goals. This approach is based on the belief that ordinary people are capable of understanding and changing their social reality if they are empowered. Or as Tandon (1988: 13) states:

> Its articles of faith include a commitment to collective participation, and empowerment of the ordinary people in having and knowing their world; in envisioning a new society; and in playing their collective roles in that process of transformation.

Critical theory provides an epistemological foundation for participatory research as a method for imminent critique of oppression and supports the importance of solidarity for collective action. This thesis has been advanced by Comstock and Fox (1993: 107) who recently wrote:

> Participatory research based on critical theory can be an epistemologically grounded method of generating liberating knowledge and testing the validity of that knowledge in political struggle.

In terms of critical theory, I adopted the view participatory research can be the practical means by which a critical dialectic of instrumental and practical reason can be restored (Comstock and Fox 1993), leading to a process of enlightenment, empowerment and emancipation. According to Fay (1987), it is only when these three phases of the tripartite process are complete that the practical intent of critical social science is achieved. Participatory research as a practical expression of critical theory recognises the ideological, political and historical constructedness of social realities and attempts to interrupt and interrogate those social practices that have systematically distorted people's view of their world. The framework is guided by three meta-theories: a theory of false consciousness, a theory of critical education and a theory of collective action. A summary of this framework is presented as Appendix One.

In this paper I have focused on the concept of 'empowerment' as an outcome of (re)constructing a community voice, being mindful the processes contained in such a framework is not linear or sequential. The framework itself has been artificially constructed and imposed as a tool for analysis and interpretation. That is to say the approach adopted by the Laverton Park community was emergent, responsive and dynamic. During the project individuals and the collective responded to the substantive issues as they were exposed throughout the critical project (see Malone 1996) and were not imposed with a predetermined research design.

### Exposing false illusions as a pre-requisite to empowerment

To understand the approach adopted by the community at Laverton Park in constructing a discourse of environmental popular knowledge it was imperative to first identify the source of the communities disempowerment. As I foreshadowed in my earlier discussions on the nature of the community and its social, political and environmental context the basis of the communities disempowerment was in some part due to a number of self-understandings or what I term as 'false illusions' about the communities capacity to be active participants rather then passive victims in the construction of their own reality. The process of enlightenment based on a guiding meta-theory of false consciousness[1] seeks to eliminate socially caused misery by the emergence of people who are conscious of themselves as active and deciding beings (Fay 1987). It is based on the belief that people's suffering is in part caused through a failure to develop the powers of rational reflection by which false illusions can be exposed and scrutinised. By providing an opportunity for ideology critique, rational self-reflection and collective autonomy people are able to appreciate their place in history and learn they are the narrators of their own lives and can exercise power as self-determining agents of change. This self-determination is a pre-requisite to empowerment and aims at providing the foundation for the development of a counter-hegemonic discourse such as environmental popular knowledge.

The source of disempowerment for the community at Laverton Park when expressed as false illusions could include:

- Their powerlessness and voicelessness was a consequence of their class status, lack of education, income and political clout and this was their 'destiny' or 'lot' in life and couldn't be changed.
- They weren't knowledgable about the environment or environmental issues because of their lack of formal education and consequently they had nothing to offer decision making processes.
- Through their choice to live at Laverton Park they had made a rational decision to endure the degraded environmental conditions as it was 'their cross to bear'.

Giving up these illusions required the community to abandon those self-conceptions and social practices serving to reproduce the power of tne 'other' through false consciousness. At Laverton Park this involved altering the balance of power through the reconstruction of a new identity where the community no longer perceived themselves as mere objects of their social conditions but as the makers of their social reality. Freire (1972) articulates this critical consciousness, learning to see the source of oppression as due to certain social forces, as *conscientizacao* (conscientisation). Freire (1972) argues that education based on a theory of critical education must aim to develop in people their latent ability to critically assess their situation with the view of changing it. The essential element of this education is that the 'oppressed' realise that they have internalised the values, beliefs and worldview of their oppressors.

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[1] A theory of false consciousness is premised on the view that the self-understandings of people in capitalist society are shown to be illusions in which they take forms of their own self-activity - - such as God, the market, or the state -- to be objects independent of themselves which they must obey. These illusions function as the means for the maintenance of social order and in the process of recreating social conditions through the elimination of false consciousness fundamental changes can be made.

The educative process at Laverton Park was two fold, firstly it created the conditions for participants to expose the basis of their false illusions (enlightenment) and secondly, it endeavoured to develop environmental popular knowledge that encouraged and supported them to change through social and environmental activism the conditions that served to sustain their oppression (empowerment).

## (Re)constructing lived experiences through environmental popular knowledge

Popular knowledge as expressed by Fals Borda (1982: 26) is:

> ... knowledge belonging to the people at the grassroots and constituting part of their cultural heritage. It remains outside the formal scientific structure built by the intellectual minority of the dominant system because it involves a breach of the rules.

The view of popular knowledge used in this paper draws substantially on Gramsci's (1971) notion of the 'organic intellectual' who relies on experiental knowledge -- knowledge vehemently dismissed by the dominant culture as 'subjective', 'value-laden' and not valid (Merrifield 1993). Gaventa (1993: 39) advances the view that by reclaiming knowledge from the dominant system has a number of benefits for the producers of the knowledge:

> In seeing themselves as capable of producing and defining their own reality they become activated to change it; a greater consciousness and clearer analysis of their situation may develop; and the new knowledge produced can become a resource for challenging the hegemony of the dominant ideas.

The community at Laverton Park engaged in a number of activities to support the production of environmental popular knowledge. These activities emphasised an educative process where all participants (including educators at the school, students and community members) participated equally with the environmental experiences and understandings of participants represented through authentic dialogues. The educational process was reliant on the valuing and legitimisation of people's knowledge and supported the appropriation and reinterpretation of knowledge advanced from the dominant system. The environmental education activities served to reconstruct the false illusion held by the community that they were not knowledgable about the environment and therefore had nothing to offer in regard to environmental issues in their local area. The following quotes express the frustration of participants when encouraging community members to contribute to the development of environmental popular knowledge. As one local resident stated:

> It's not so much that they don't know how to think for themselves, it's just that they have got out of the habit of thinking for themselves. It's not a role they feel comfortable in.

The following quote highlights the embodiment of the illusion that legitimate knowledge existed as a consequence of 'formal' institutionalised educational processes:

> I went to this meeting at the old school house at the other side of the creek and I looked at some photos of the RAAF base and there was a house here and a house there, that was it. And I was talking to a lady there and she said 'I can remember when it was like that'. I said 'well you must know a lot about the area', 'oh not really' was her reply. I mean she was there when there was probably a dozen houses in the area and yet she doesn't consider she knows anything (Let Laverton Creek Live Committee member, February 1994)

To overcome the embodiment of the false illusion that 'valid' knowledge was constructed by the knowledge elite and that living in an environmentally degraded area 'was their cross to bear' the community in cooperation with the local school set about organising a variety of forums where the knowledge and concerns of community members were valued and legitimated. These activities included:

Public or community meetings: Community members where invited to participate in collaborative focus group workshops where they were asked to address and discuss two main questions; what they would like to see happen at McCormack Park, and what issues or concerns that felt may effect future redevelopment plans. From these meetings a community report was developed and sent to the Land Managers.

Oral histories: Students from the school invited local residents to share their knowledge of the area. Knowledge that had been accumulated after years of living at Laverton Park. The knowledge was then used as the basis for determining how to return the area to its original condition.

Mural painting: The local indigenous people where asked to share the indigenous history of the site and a community mural was painted on a school building depicting the significance of the site to the Dreamtime. A sacred site within the school was developed and planted with indigenous plants and proclaimed by the Aboriginal people as a symbol of the connectedness between the land, the Aboriginal people and the community at Laverton Park.

Environmental festival: An environmental festival was held at McCormack Park where community members where invited to participate in experiential activities in the environment to share visions of how the park could look in the future and to reflect on how it had changed over time.
Tree planting: Community members where involved in a number of planting days where they planted indigenous plant stock and were invited to participate in social activities such as barbecues, face painting and informal conversations.
Professional development: The Laverton Park Primary School through the development of its environmental education program initiated a number of professional development days where community members were invited to participate collaboratively in learning opportunities with educators. The content of these professional development days were areas identified by the school and community as supporting the development of critical consciousness, enhancing self-esteem and establishing a community identity.

What emerged from these forums, initiated through the community and school, was the development of a discourse of cooperation and participation that instilled a sense of ownership and connection between the members of the community with their local environment. The experiential knowledge of individuals 'what it **felt** like to be a member of the Laverton Park community' was for the first time being acknowledged and celebrated.

In a community where most participants left school at an early age and were long term unemployed enhancing self-esteem and providing the opportunity for learning as a tool for self-determination was a crucial step in the task of empowering individuals. The source of their empowerment was the realisation they had legitimate 'rights' to a safe and healthy environment. That they 'the community' could be self-determining and become active agents in changing the social conditions that their lives were embedded. They no longer felt they had to 'put up and shut up' [an Australian colloquial expression].

### Significance for environmental education

In this paper I have provided a small part of the community based environmental education program that was initiated at Laverton Park. I have argued that empowerment for raising critical consciousness is aimed at revealing fundamental power imbalances and naming the silenced. By giving the silenced a voice the first steps towards challenging and changing these power imbalances are enacted. I have supported the view that the oppressed may not through their experiential learning become the agents of broad social reconstruction but they will through popular knowledge for empowerment become the **narrators** rather than the consumers of the stories which are produced and constructed for them (Lincoln 1993). As narrators they can become agents of their own personal change process -- they can write (or rewrite) the stories of their lives based on their lived experiences and tactile knowledge. A community member illustrated this point when I asked him to respond to the question 'What did I gain from being involved in the project?':

> It gave me the opportunity to reflect on and assess my participation/performance thus far and judge what effect/change if any, and to what extent my involvement has had on me. Moreover, it has engendered in me a greater appreciation/respect for the power of individuals, representing themselves personally / NOT THE STATE, by making me aware of my own unrecognised/un? under? realised abilities, and giving me a desire and increased confidence to act on and fulfil this potential. Not merely as an anarchist anti-government activist but as a spirited morally motivated, pro-active citizen advocating socially just reform. (Community member October 1993)

Reflecting on the activities of the Laverton Park community there are a number of elements which serve to advance discussions on environmental education, the most useful being the importance of providing a supportive and nurturing environment to foster the sharing of stories. I believe sharing stories in the context of building alliances, community solidarity and identity can be an empowering process. Through the production of environmental popular knowledge we can begin to articulate the grievances of a specific group of people, provide a vocabulary of self-expression and self-reflection that values their lived experiences as a legitimate way of knowing and being knowledgable. I argue we not only have the capacity to empower individuals through the legitimisation of alternative readings of history but we can question and change the very definition of what constitutes valid knowledge. Or as Gaventa (1993: 40) states, "... it raises fundamental questions about what knowledge is produced, by whom, for whose interests, and toward what ends". Through sharing lived experiences community members can begin to identify what the 'real' social, environmental and health implications of living on the fringes of industry impose and share their environmental knowledge with others. This is a significant shift in the view of knowledge embedded in most environmental education programs emerging from the current trend to market models of education.

### A final comment

Communities and educational institutions are under extreme pressure in the current political climateto become absorbed into the economic imperatives of a postindustrial global economy. The consequences of this shift to economic rationalism is the possible loss of control of education and educational institutions and the disintegration and fragmentation of communities. For the powerless and voiceless to be heard in these times of global politics we need to create the conditions whereby environmental educators in the formal and non formal educational domain are mutually supportive. I argue that through community solidarity we can reclaim the silenced voice and (re)construct environmental popular knowledge as as tool for dismantling the master's house.

And as a Laverton Park community member states in this following passage we need to not only reclaim silenced voices, we need to share our stories to inspire others:

> We as a community set about to change our situation and in may ways we have. Not just the planting but because we as a community hadn't talked at meetings shared our anger, if nothing else we can say the community has learnt to identify itself as a community. So next time if we have a concern we know now we can do it and we have the skills to set up a process of change -- we aren't scared of making our voices heard. And as events unfold, and the benefits become obvious for positive social reform, it will inspire more people to actively participate and lend their voice and hands to the growing chorus of dynamic harmony for social and environmental change.

In closing this paper I would like to thank the community at Laverton Park for their generosity in sharing their stories -- for showing me how a community can share a vision for change. I have endeavoured to repay their generosity by sharing their story and their vision in the hope that it will inspire others to take on the environmental challenge.

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**Appendix One**: Theoretical framework for analysing a participatory research approach to environmental activism

| **A participatory research approach to environmental activism** | | | |
|---|---|---|---|
| **Participatory research approach** | Research | Education | Action |
| **Goal of the approach** | Enlightenment | Empowerment | Emancipation |
| **Aim of the approach** | • to identify false illusions by engaging in activities of ideology critique, rational self-clarity and collective autonomy | • to produce a counter-hegemonic discourse based on the lived experiences of the collective | • to be empowered to challenge and overcome the source of personal and collective powerlessness through collective action |
| **Contribution to environmentalism as a social movement** | Environmentalism as ideology | Environmentalism as counter-hegemonic discourse | Environmentalism as collective action |
| **Guiding meta-theory** | *Theory of false consciousness* | *Theory of critical education* | *Theory of collective action* |
| **Based on the work of:** | Freire (1972)<br>Fay (1987) | Freire (1972)<br>Carr & Kemmis (1983)<br>Fay (1987)<br>Giroux (1985 1992)<br>McLaren (1994) | Touraine (1983)<br>Eyerman and Jamison (1991)<br>Tarrow (1994) |

# 'Streamwatch' in Vietnam: Intercultural Communication and the Theory and Practice of Environmental Education.

**Neil McLaren & Brian Ferry,**
**Environment Research Institute, University of Wollongong**
**Renato Ramsay, Streamwatch, Sydney Water**

## SUMMARY

This paper reviews a collaborative training project on water quality monitoring conducted in Vietnam and is contrasted with similar work in Australia.

From the work in Vietnam a number of observations and inferences are made. Strategies are suggested in relation to each area. The observations and inferences relate to seven areas :-
1) Teaching strategies in response to Vietnamese culture.
2) Teaching strategies in response to scientific training
3) Teaching strategies in response to scientific methodology
4) Participants understanding of environmental science versus environmental education
5) The need for complex answers to complex problems
6) The need for coordination of resources including the development of networks for people, their training and the supply of resources
7) Public attitude to achieve behaviour change.

## INTRODUCTION

This review is of a recent environmental education project involving water quality education in Vietnam. The project was funded under the Federal Environmental Protection Agency's Environmental Cooperation with Asia Program and was conducted in cooperation between the University of Wollongong's Environment Research Institute, Sydney Water and the National Environment Agency of Vietnam (NEA). Science and engineering staff of the National Environment Agency (NEA) of Vietnam participated in a modified 'Streamwatch' program.

The aim of the project was:
1) to teach the use of in-field laboratory equipment to test water quality,
2) to teach the participants to be able to teach others,
3) to plan for the use of locally sourced laboratory materials, and
4) to develop strategies for using existing social networks to enable monitoring.

The training was firstly directed at skills for in-field water testing and involved 20 regional staff drawn from the environmental monitoring stations throughout Vietnam. As the second part of the training a further 10 participants from the regions surrounding Hanoi joined the course to test the train-the-trainer skills of the original participants. In addition, a workshop was conducted for managers of the environmental monitoring stations in the following week.

Water quality tests were selected to provide internationally accepted criteria for water quality assessment and utilised procedures in the 'Streamwatch' water testing kits. The water quality tests were: 1) dissolved oxygen (DO), 2) microbial, i.e. faecal coliform, 3) pH, 4) biochemical oxygen demand (BOD), 5) temperature, 6) phosphates, 7) nitrates, 8) turbidity, 9) total solids, 10) macro invertebrates.

## THE DYNAMICS OF ENVIRONMENTAL ACTION.

The reliability of community based environmental assessment has been questioned in the past and will no doubt continue to be questioned. The general response from engineers and scientists is that the ideas and tests for reliable water quality monitoring are too complex for people without at least technical training or preferably academic training. This is despite the fact that historically, the laboratory staff that has supported the scientists and engineers, has in some cases had little formal training if any. Quite often they were prized for their reliability and consistency to perform set analysis tasks. The tasks may be considered too boring or the tasks may involve an ability that comes from regular practise. Thus it may even be beyond the ability of the scientist or engineer in charge of the monitoring.

Studies have shown that community based assessment is reliable. Reynolds ( 1986) in his study of community based water quality assessment demonstrated as good or better results from community based monitoring than from government, scientific monitoring. In addition the network of community groups through their sheer numbers and dedication are able to cover a wider area and gain more detailed information over a set area or time. Most importantly, these groups have a personal interest in the water quality due to its effects on them and their families. Robottom (1987) points to the importance of the environmental education operating in the affective domain to enable individuals to take action 'for' the environment as the key to success.

Our own experience in the water supply area of Sydney, Australia with a schools based system, called 'Streamwatch' agrees with these findings. Engineers and scientists have at first been dismissive of results from community groups that conflict with their own results or expectations. Over a period of time, the consistency of all the community groups has built up a reputation that achieves a positive rather than a questioning response from the scientists and engineers. Quite consistently, community water testing in the Sydney area has been able to identify leaking sewer mains that were not being picked up by government monitoring groups. The main reason for this is that the community groups are able to gain information of equal quality to the expert at more numerous sites and at more frequent time intervals.

The most important factor has been the groups or individual's personal stake in the quality of the local water bodies. A case in point was a local stream used for swimming. Although government requirements were in place for water quality monitoring and reporting, there was no requirement for action from the government personnel. The local community group, from their own tests, found that the stream was severely contaminated by faecal bacteria. The community group was able to bring about immediate, remedial action as they were aware of health affects, including meningitis, that had resulted in their community from this pollution. When confronted by the community group, the government personnel replied that their only requirement was to monitor and report at the end of the twelve month period. In fact, they had no personal interest in the stream and were not aware it was used for swimming or that health effects had occurred. Certainly the reaction of the community demonstrates the importance of involving stakeholders with an 'affective' reason to take action 'for' the environment. The reasons outlined above have promoted community based water quality monitoring around the world.

## VIETNAM AND ITS ENVIRONMENTAL CHALLENGES

Vietnam has similar reasons to be drawn towards community based water quality monitoring. The country has a considerable lack of infrastructure in line with other developing countries. It is a developing economy growing at a rapid rate with an equally rapid population growth. The population is approximately 70 million, growing at over 2% per annum (Socialist Republic of Vietnam 1992). The rapidly growing economy is placing demands on the environment, including the water resources of Vietnam. Uncontrolled industry has the potential to pollute water supplies. The need to produce greater quantities of food has the potential to degrade existing farm land or require the use of more marginal land. This also has the potential to affect the quality of water (Socialist Republic of Vietnam 1992).

Poor water quality, especially in urban areas, has been identified as one of the most pressing environmental problems in Vietnam. As a result of 30 years of war, and 15 years of political isolation, much of the water supply infrastructure was destroyed or failed because of inadequate maintenance programs. The quality of water has direct affects on the quality of life and Vietnam is no exception. Water-borne diseases represent a continuing threat to the local populations. Reticulated water in Vietnam is boiled, where possible, before drinking to destroy the pathogens. Bottled water is available but is beyond the income of many.

One of key issues is the development of monitoring programs to assess the quality of water. There is also an urgent need to quantify the health impacts of poor water quality. This will enable targeted responses to be made to the most important and urgent needs on a quantifiable basis.

This project is a critical component of Vietnam's social and economic development. As Vietnam develops its industrial and urban infrastructure from its largely rural base at present, environmental problems, especially water quality, are likely to intensify, requiring well trained and resourced staff. If such environmental problems are not planned for and regulated, the pace of economic and social development may well be severely hindered.

## CASE STUDY OBSERVATIONS, INFERENCES AND STRATEGIES

A number of observations and inferences were made during the training course and the workshop. In some cases the planned teaching strategies and approaches did not appear to work effectively. Where possible, alternative and responsive teaching strategies were adopted. In other cases, where more immediate responses were not possible, general ideas are given to enable advanced planning to adapt to the situation. The observations, inferences and strategies relate to seven areas :-

1) Teaching strategies in response to Vietnamese culture.
2) Teaching strategies in response to scientific training
3) Teaching strategies in response to scientific methodology
4) Participants understanding of environmental science versus environmental education
5) The need for complex answers to complex problems
6) The need for coordination of resources including the development of networks for people, their training and the supply of resources
7) Public attitude to achieve behaviour change.

### 1) Teaching Strategies in Response to Vietnamese Culture.

The accepted processes of learning and teaching in Vietnam is more teacher centred and is similar in other Asian countries (NCELTR, 1991) The participants in both the training course and the workshop, appeared to have an expectation of listening without questioning. The lecture and demonstration sessions had little participation in the form of questions or replies to questions. Where the participants were directly asked to be active they were very cautious and this was only accepted by the more able. There are probably two underlying attitudes that exist in most cultures, but are more strongly held in Vietnam that affect the student / teacher relationship. Firstly, to question the teacher implies a criticism. This is difficult to overcome if the over-riding attitude is that the teacher is a higher authority to be respected. Secondly, for the student to ask a question implies that they are not capable of understanding the content being presented. By directing the participants to work with each other these problems appeared to be reduced. Given relevant local tasks to work on as a group, they were more responsive to each other and required less prompting to participate. The belief is that when working with peers it will lessen the perceived potential for failure or criticism and will increase their confidence.

### 2) Teaching Strategies in Response to Scientific Training

Much of the participants thinking is subject based, which presents problems when you have a complex environmental problem that cuts across the sciences. Generally, the participants science training was from Russia and eastern European' institutions that have a narrow discipline base from the beginning of the first year of study. The understanding of the participants, of other areas of science, was often quite limited. By directing participants to work in groups that are chosen to include a range of scientific backgrounds, there was a potential for the group to take on and solve more complex problems. This is particularly important as environmental problems usually require a multi disciplinary approach. At the same time group members were exposed to other areas and concepts in science, and were able to learn from each other.

### 3) Teaching Strategies in Response to Scientific Methodology

During the training and workshops the paradigms of scientific thinking needed to be challenged by the differing model of environmental education. There is a much more detailed sequence that needed to be understood by the group as they move from being scientists to educators. Science and environmental science methodology relies on a sequence of:- 1) hypothesis, 2) testing, 3) communication (Harlen, 1992). In science the 'testing' of the problem is usually only a demonstration on a limited experimental basis To enable community groups with little or no background in science to work on environmental problems their methodology starts from a more limited base and has to progress to a point of action to control the problem on an extensive basis. The methodology of the group requires a sequence of:- 1) understanding the ecological concepts; 2) understanding the impact of humans on the environment; 3) the development of abilities of prediction (hypothesis) and testing, 4) the development and use of a wide variety of action taking skills. These are skills that will bring about changes to reduce, prevent or stop the problem (Disinger, 1994). This last step in the sequence, action taking, can include skills in a variety of areas such as; science, education, communication and liaison. An individual scientific officer or even a monitoring station can only take action if they are supported by government and community to follow through. This must me considered when setting out to rectify water quality problems. The scientific skill of one trainer are only part of the overall strategy of education. An educator must keep in mind the total process required of a community group and their reasons for being 'stakeholders' in local water issues.

### 4) Participants Understanding of Environmental Science Versus Environmental Education

The Vietnamese participants were generally well qualified in science but not in education. There approach to education is often similar to their approach to science research as outlined above. When they come to teach they fail to stress the reasons of why a water test is done, but only stress how it is done. Again they needed to be referred to the methodology above and be able to help people to understand the sequence of environmental education. In particular, trainers needed to develop skills in the initial steps of explaining ecological concepts and the impact of humans on water in terminology appropriate to a public audience that is likely to have less education than themselves.

It may be best to get science educated trainers, to recall how they became engaged in science, or in this case, water testing. This is important to allow them to see the relevance of why they should include this in their own teaching. By doing this they are giving reasons for actions and are moving into the affective domain of learning.

### 5) The Need for Complex Answers to Complex Problems

As the saying goes, 'there are always simple answers to complex problems and they are always wrong'. With environmental problems they are often complex and usually also include social problems to consider. An example is one of the most central lakes, Hoan Kiem, in Hanoi where some of the field work took place. It is moderately polluted but contains turtles which have a cultural significance in national legends. The water flowing into and out of the lake is controlled by six different government bodies. To date, it had not been possible to get representatives from these bodies to a meeting. Efforts to dredge the Lake has only disturbed the polluted sediments and exacerbated the pollution. Local people still fish out of this lake although they have been warned by local authorities not to allow livestock to drink from the lake.

This example highlights the complexity and the importance of an integration of all objectives from the stakeholders in the local watershed. This is an impossible task for individual field staff. The solutions must come from all groups within the community and with the consent and assistance of government. The training of interested people from communities in the use of field monitoring equipment to monitor water quality will enable informed actions.

### 6) The Need for Coordination of Resources

Networks of cooperative groups are essential for the success of community water quality monitoring programs. Linking and coordinating groups is a key process in the solution to a complex community-based environmental problem.

There is the possibility of extending the current project, in Vietnam on in field water quality monitoring, to regional schools. This method has met with much success in Sydney, Australia and elsewhere in the world. One of the aims of this is to enable teachers and students to participate in watershed monitoring and action with easy to use field equipment on a relevant topic, i.e. local water quality. The complimentary aim is to develop a community network at a local level.

Another point to consider is the equipment used. Quite often the associated equipment is purchased with the good intentions to achieve some improvement to local watersheds. However equipment can end up lying idle for a range of reasons, e.g. flat batteries, lack of replacement reagents, or lack of confidence and ability of staff.
Equipment needs to be purchased on the basis of the goals of the overall project. At the same time there needs to be plans for collation of data and for action to result from the data. A key question here is, 'if no action is to occur as a result of testing, what is the purpose of monitoring?'

The process we are attempting to use in Vietnam has been to provide equipment on the proviso that it is used for water quality education of a community and not for environmental science-type monitoring by a few. Again, it is important to understand the models of how it is necessary to operate community based water quality education and action. As part of this, it is necessary to have regular reports from each group and replies communicated in response to these.

### 7) Public Attitude and Behaviour Change.

As with most communities around the world, there has been a noticeable change in the Vietnamese public's tendency to report or question pollution (Viet Nam News, (1996). Previously the public has said little about pollution and environmental problems. There is now an overwhelming increase of public reporting, particularly of point source pollution. Such behaviour by the public must be supported by investigation, reporting, action to reduce or avert the problem, and if necessary fines for those who disobey accepted policies. This is an area requiring much work in Vietnam.

## CONCLUSION

In many ways the problems we have encountered in Vietnam are no different to those we have encountered in the greater urban area surrounding Sydney, Australia. By sharing ideas on strategies to address the complexity of environmental education, we will all benefit from each other. To a large extent, our team learnt more than it taught.

This project and its future progression will be a critical component of Vietnam's social and economic development. As Vietnam develops its industrial and urban infrastructure from its largely rural base at present, environmental problems, especially water quality, are likely to intensify. This will require well trained and resourced staff. If such environmental problems are not planned for and regulated, the pace of economic and social development may well be severely hindered.

Although this project has been completed, this was only the initial step in a project that needs to be continued for the sake of the long-term interests of Vietnam. A considerable challenge still exists on how to establish a viable national water quality monitoring system that is both reliable and cost effective. The system will need to enable corrective action to be taken in response to environmental problems. The solutions to this challenge will result from the participation of all groups of people within Vietnam. These decisions should be at all times in the hands of the Vietnamese people, for only they can understand the complexity of the problems and take the appropriate action.

The next step proposed, for our cooperative work, is for two case studies in two separate provinces. The intention is to fully integrate water quality objectives with the needs of the community. It is intended to include risk assessment and cost/benefit analysis to enable justification of the work to continue to a national basis. Acceptance of the need for a national water quality monitoring system will only result if information on the associated risks of poor water quality and the cost/ benefits of action to improve water quality can be strongly argued.

The way that this is achieved by both Vietnamese staff and collaborators from other countries will depend on the ability of all to be sensitive to the strategies necessary for participation of all. The observations, inferences and strategies stated here are some ideas that should be kept in mind by those involved. There is no doubt that further study in this area of environmental education and specifically water quality education will be integral to the achievement of Vietnam's economic, social and environmental goals. Each goal is inextricably linked.

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# Environmental Education In Five Pacific Nations

Peter Metcalfe
Department of Curriculum Studies
University of New England
ARMIDALE NSW 2351

## SUMMARY

This paper summarises the environmental problems faced by the Pacific nations of Fiji, Tonga, Western Samoa, Vanuatu and the Solomon Islands. These island nations suffer several environmental problems in common and share the urgent need for effective environmental education at all levels. As material expectations rise, local ecosystems are under pressures from large tourist or plantation developments and from subsistance farmers and fishermen expanding their activities to earn a cash income. Population growth is also a problem in some localities.

Environmental education in schools varies greatly from country to country. In general terms it has not received adequate attention in the curriculum development process in recent years. Non-government organisations and government agencies, other than education, are providing valuable inputs in the form of teaching materials and public education campaigns. The South Pacific Regional Environment Program continues to provide high quality environmental information and educational resources.

## INTRODUCTION

From August to November 1994 I visited, Fiji, Tonga, Western Samoa, Vanuatu and the Solomon Islands to look at the actual environmental situation and the environmental education content in curriculum at primary and secondary level and within teacher training.

In each country a range of institutions, including Curriculum Development Units, Teachers' Colleges, Departments of the Environment were visited and people having some brief in environmental education and/teacher training were informally interviewed about the situation. Whenever possible, relevant documents were obtained.

In each country I participated in an environmental education workshop, for teachers or for teacher educators or environmental agencies.

## SOUTH PACIFIC OVERVIEW

Overall the environmental situation is gloomy.
The nations visited all show various levels and trajectories of environmental degradation, as summarised in table 1.

Each nation appears to have inadequate levels of environmental education in their curriculums. Curriculum development in the area of environmental education is not proceeding at a satisfactory pace.

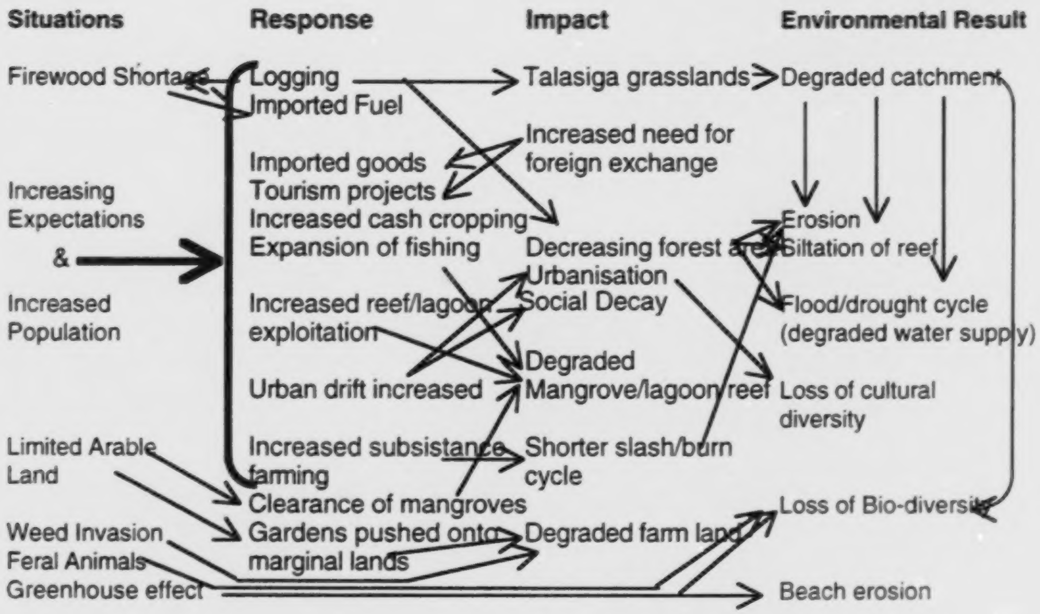
Situations
Response
Impact
Environmental Result
Firewood Shortage
Logging
Imported Fuel
Talasiga grasslands
Degraded catchment
Increased need for foreign exchange
Imported goods
Tourism projects
Increased cash cropping
Expansion of fishing
Increasing Expectations
&
Increased Population
Erosion
Siltation of reef
Decreasing forest area
Urbanisation
Social Decay
Increased reef/lagoon exploitation
Flood/drought cycle (degraded water supply)
Degraded Mangrove/lagoon/reef
Urban drift increased
Loss of cultural diversity
Limited Arable Land
Increased subsistance farming
Shorter slash/burn cycle
Clearance of mangroves
Loss of Bio-diversity
Weed Invasion
Gardens pushed onto marginal lands
Degraded farm land
Feral Animals
Greenhouse effect
Beach erosion

Figure 1. The interaction between people and the South Pacific environment.

## THE ENVIRONMENT

Figure 1 shows that there are complex causal connections between the many specific environmental problems facing Pacific nations. However for the purposes of this paper the problems will be discussed separately, with examples taken from specific countries. These problems include:

Population Growth / Urban Drift

Population growth rate is the primary cause of many environmental problems. Table 1 shows that fertility rates, net migration rates and total growth rates varies between countries. Fertility rates are high by world standards. For example, the Solomons with a population of 376 000, and 3.5% growth rate the half million mark will be passed in 2006. Unfortunately, the economy is growing at less than 2% per annum. (World Bank Report, 1993 a)

Net growth rates are greatly modified by migration. Significant migration from Fiji, Tonga and Western Samoa acts as a relief valve for population pressure but also a "brain drain" from these countries. (World Bank Report, 1993 b, 1993 b) However, remittence money helps families and contributes to the national economy.

The problem of urban drift is evident in every country. For example, the growth of Honiara continues with the inflow of people from Malaita, Rennell -Bellona and other islands giving a population density is approx 2 900 people / km$^2$. For the Solomons, overall population density is about 14 / km$^2$ but 140 / km$^2$ of arable land. (Anon 1993 c)

Urban expansion is a major pressures on mangroves close to Suva, Nuku'alofa and Apia. Mangroves are not "owned" and are used for garbage dumping, housing and industry.

Other problems associated with urbanisation include rising imports of materials, technology and energy, which weakens the trade balance for these fragile economies. For example, in Vanuatu the ratio for imports over exports is 5:1.

Urban fringe settlements often have an inadequate water supply. Water shortages are also a problem for smaller communities. For example, villages have degraded catchments due to logging, clearing and /or expansion of cash cropping. Also, groundwater supplies might be polluted by sewage, garbage or agricultural chemicals. Bore fields that supply Nuku'alofa and Port Vila are threatened by agricultural chemicals and urban expansion respectively.

With rising expectations among the populace and increasing imports of technology such as refrigeration, air conditioning, television, trucks, cars and outboard motors, energy is a growing problem. Only Fiji and Western Samoa having large scale hydro schemes operating. Even so, electricity costs 40 c per Kwh. in Apia. Most electricity is generated with imported diesel fuel and is very expensive. However, energy demand, especially electricity, is growing faster than population growth. These nations face ever growing energy imports.

Firewood is the energy crisis of the poor. In many urban communities there is a growing demand for LP gas for cooking but firewood is still necessary for the traditional "lovo". Agroforestry sections of Agriculture curriculums should promote firewood plantations.

## Land Degradation

Bryant (1992) identifies key environmental problems in the Pacific as accelerated depletion of soil resources, deforestation and pesticides effects on human health and the environment. Population and income growth are seen as the underlying cause of these environmental problems.

Land degradation is closely linked to population growth, especially when arable land is in short supply. For example, in Vanuatu, with 25% of its area mountainous, 10 % volcanic footslopes and 8% volcanic cones, population is projected to double from 230 000 to 460 000 in about 25 years. (CSIRO 1990)

In the steep volcanic islands of Fiji and the Solomons the impact of cash cropping has been disastrous in terms of soil erosion. Fiji has been expanding the sugar industry and marginal sloping lands are now being used. There is a corresponding reduction in yield of cane per hectare and reduced cane quality. Severe soil erosion is clearly evident in some steep areas. Ginger as an export crop has also resulted in severe erosion.

In both Tonga and Vanuatu a new environmental pressure is the expansion of the area devoted to growing pumpkin for the Japanese market. The very high standards are set by the importers and there is no local market so huge piles of rotting reject fruit are seen. The growers have to produce blemish-free fruit and spray insecticides quite heavily. Perhaps in these islands the biota is so reduced that there is a shortage, or even absence, of predators to protect the monocultures of pumpkins from pests.

On Tongatapu the expansion of pumpkins appears to have reduced the area devoted to other crops. Locals complain that supplies of fruits and vegetables in the Nuku'alofa market have been reduced. Prices are surprisingly high. For example, bananas at $2.50/ 4 or 5, are about four times the price in Fiji. Even basics, like coconut at 60c each and kumala, at $30 per 15 kg basket, are expensive.

In the Solomons the growth of Honiara has encouraged the expansion of cash cropping on Guadalcanal. This has led to soil degradation during cropping and weed infestation after gardens have been abandoned.

Table 1. Population data and environmental problems in five Pacific countries.

| ENVIRONMENTAL PROBLEM | COUNTRIES | | | | |
|---|---|---|---|---|---|
| | Fiji | Tonga | Western Samoa | Vanuatu | Solomon Islands |
| *Net fertility rate (%) | 3.1 | 3.1 | 4.6 | 5.7 | 6.5 |
| *Net migration /'000 | -5.2 | -18.8 | -25.7 | -2.5 | 0 |
| *Population growth (%) | 1.8 | 0.4 | 0.3 | 2.9 | 3.5 |
| Urban drift | ## | ### | # | # | ## |
| Rising imports | ### | ## | ### | # | ## |
| Energy imports | ## | ## | ## | # | ## |
| Water shortage | # | ### | # | ? | ## |
| Over clearing and logging | # | #### | ## | ## | ## |
| Soil erosion | ### | # | # | ? | ## |
| Increased cash cropping | ### | #### | # | ## | # |
| Agric chem use | ## | ## | ## | # | # |
| Shorter farm rotations | ## | ## | # | ? | # |
| Weeds and feral animals | #### | # | # | # | ## |
| Mangrove destruction | ### | ## | # | # | ## |
| Reef degradation | ### | #### | n/a | # | # |
| Over fishing | ## | ## | ? | ## | ### |

ARBITRARY RATING SCALE
# Evident
## An emerging problem ? not noted
### A problem
#### A serious problem n/a not applicable

* World Bank 1993 a. Pacific Regional Post Secondary Education Survey

### The Value of Indigenous Species

Island people are only now beginning to understand the value of their natural ecosystems, both marine and terrestrial. National curriculums have some basic ecology in them but the ecology of islands needs greater emphasis for long term sustainability.

Many countries in the South Pacific have diverse and interesting floras but the local plants have been ignored in landscape plantings. Some of the recently introduced trees and plants are now weeds in these fragile island environments. The biology of invasions are all to evident on each of the countries. Awareness needs to be developed at all levels about the intrinsic value of local plants in landscaping and the problems of introduced plants in the environment. The awareness of indigenous plants and the national identity of these countries should be enhanced by the presence of local plants in public places, especially around school grounds. A separate paper 'The Place of Indigenous Plants in Pacific Landscapes" is available.

The growing desire to preserve local cultures is a force that can be harnessed to aid in the localisation of school and community plantings. Through out the Pacific nations there is already a groundswell of desire to preserve indigenous culture. There is a strong functional link between culture and the indigenous plants as well as the plants introduced by the Polynesian or Melanesian settlers (Taule'alo 1993). It would seem that, by emphasising the cultural value of local plants, they may be given a higher priority in school and horticultural plantings. This approach is advocated in the National Environment and Development Management Strategies (NEMS) for Western Samoa Biodiversity (Anon 1993 d)

Ecotourism is growing in all the countries visited. Ecotourism helps raise the value of both biological diversity and cultural diversity in the Pacific nations. There is also an interest in traditional medicinal plants as part of local culture. Ideally there should be a swing away from growing plants introduced by Europeans, except for those that have become part of the local culture, and a move towards growing local species and indigenous imports that are characteristic of the local environment and local culture.

The current rush to modernise curriculums with a leaning towards economics and business studies overlooks the importance of the plants and animals that support life on these fragile islands.

One of the simplest and most cost effective strategies is to have students propagate and grow appropriate native trees and plants to improve the environment of their school. Such plantings can be encouraged by changing curriculum. Appropriate understandings, skills and attitudes can be developed within the subjects of geography, science and agriculture in the secondary curriculum. Gardening and school ground improvement is part of primary curriculum and emphasis should be placed on local species.

### Forests and Logging

Fiji has little untouched native forest left but previously embarked on an extensive pine planting program and now pine timber and woodchips are being produced. Older settled areas such as the Namosi Valley are virtually without trees due to a long history of slash and burn gardening on the steep slopes. The steeper hills on the drier western side of the islands have been repeatedly burnt and are covered with coarse grasslands, referred to as the Talasiga grasslands.

Tonga has a few hectares of natural forest remaining on the densely populated Tongatapu but there is some forest on the less populated outer islands.

Western Samoan forests were logged and cleared for farming and have also been decimated by two cyclones in 1990 and 1991. There is very little forest left and timber has to be imported. One forest remnant in a volcanic crater is the focus of an ecotourism enterprise on the island of Savaii and the endemic Samoan Flying Fox and Tooth-billed Pigeon survive there. (Elmqvist et al 1994)

The major issue in the Solomons is logging. It is estimated that sustainable yield is only about 30 000 $m^3$ per annum while the cutting rate is about 60 - 70 000 $m^3$ per annum. The offshoots of logging have been both environmental and social degradation. The offshoots of logging have been both environmental and social degradation. The conflicts over who owns the land and who receives payment for logs has heightened tensions between groups within the community.

### Mangroves

Fiji has extensive areas of mangroves but these are being whittled away by urban sprawl, resort development and agricultural and aquaculture projects.

In Tonga big areas of mangrove dominate the lagoon and the coast of Tongatapu. Both garbage dumps and housing are expanding into the mangroves. The real dilemma for Tongatapu is whether to sacrifice farmland or mangroves to urban spread. The new wharf and harbour area, built with Australian aid, has wiped out a significant area of mangroves.

In Vanuatu mangroves occur on only 9 of the 80 islands and other than nearly 2000 hectares on Malakula there are small parcels on the other 8. Only a few hectares have been damaged in Vila. (CSIRO 1990)

## Marine Resources

Fishing data was not collected in each country but in Tonga and the Solomons I participated in workshops for teachers on marine resources.

In Tonga, the fishing fleet consists of a few small boats and two longline tuna boats. It is planned to expand the fishing industry slowly.

The Tongan Marine Research Centre and a similar centre in the Solomons have been established in response to depletion of the stocks of giant clams on the reefs. Giant clams are being bred in tanks for research and restocking based on community ownership.

In the Solomons, the situation with marine resources is confusing. Currently a fishing quota of 120 000 tonnes is allocated to various overseas and local companies. In fact there has never been a declared catch greater than 40 - 50 000 tonnes. Fisheries maintains that the quota of 120 000 tonnes is sustainable, based on data from a tagging experiment done by the South Pacific Commission. Meanwhile, fishing effort (tonnes of diesel used per tonne of fish caught) rises and the size of fish caught decreases.

## EDUCATION

The basic structure in each country more or less follows the K-6 primary / 4 junior secondary / 2 senior secondary pattern of NSW. However the significant difference is the levels of participation of any particular cohort at each level. Participation rates are quite low in the Solomons and Vanuatu. For example, in Vanuatu there is an exam at the end of grade 6 and only 20 to 30% of students go on to junior secondary. At the end of year 10 the exam allows 20 % (4% of the cohort) go on to senior secondary school. (Ministry of Education 1994b)
Another major difference is the predominance of community funded schools in each system. There are only seven government secondary schools in Fiji. The rest of the schools are community based and financed. There is still a big shortage of teachers and even in Fiji class sizes of 45 or 50 are to be found. In Vanuatu in 1993 20.8% of primary teachers and 40.8% of secondary teachers were untrained. (Ministry of Education 1994b)

A recurring complaint is the dominance of the exams which hinder the process of developing important thinking and problem solving skills. Class rooms are still dominated by the rote memorising of facts to parrot back in exams.

Another frequent complaint is the inadequacy of the process of curriculum development. These two complaints are linked in some instances because the Curriculum Development Unit deals with both the exam system and curriculum development. The exam process takes most time and little is left for renovation of curriculum.

In Tonga environmental education lies in both the science and social studies curriculum and Agriculture courses are very strongly environmental.

There is no Agriculture taught in secondary schools in Western Samoa, while in Fiji Agriculture is growing vigorously. About 40% of the Samoan population is engaged in commercial farming and just about every family has a productive garden.

In Vanuatu environmental education lies in the primary Social Studies program which combines both science and social studies.(Department of Education 1991) The Vanuatu environment is well documented in an Environment Strategy, a CSIRO environmental report, a tourism plan and a book on the Vanuatu environment by a local author. The new curriculum, produced by SAGRIC with AIDAB funds shows a fragmented approach that does not allow for cross linkages within science nor between the science and social studies strands of the curriculum.

The Secondary Basic Science Syllabus (Department of Education 1992) does not give any local examples except in geology. The syllabus allocates 15 hours to ecology without, but reference to Vanuatu ecosystems or species.

## TEACHER TRAINING

Environmental education in teacher training programs varies from country to country and within countries. For example, in Fiji the training program for secondary teachers at the Fiji College of Advanced Education (FCAE) at Nasinu has quite good programs while the staff training primary teachers at Lautoka acknowledge the deficiencies in their science and social studies units.

In the other countries the level of environmental education in teacher training programs is regarded as being inadequate by the lecturers concerned. Most lecturers responsible for teaching the environmental components of preservice courses were not confident of their own ability to teach to the depth they perceived as being necessary. Some staff also identified the traditional lecture/exam system as limiting the practical teaching of environmental education. Understaffing is a problem in most colleges due to lecturers leaving for higher salaries within school, with other government departments, private enterprise or overseas. Peace Corps and other transient expatriates help fill the gaps. A change in government in Vanuatu has created staffing problems there.

In Fiji the government supplies trained teachers to all schools. The Lautoka Teachers College (LTC) takes in 150 form 7 leavers each year for a primary program. The students do Science and Social Studies but there is little environmental education in either course. There is an option in environmental education but it is mainly theoretical. The situation will improve as there is currently an AusAID program of assistance being implemented at the college. Secondary teachers are trained at USP and the FCAE which has ben recently reactivated with AusAID and Fiji Government funds.

## CURRICULUM DEVELOPMENT

The rate and quality of curriculum development in each country is not regarded as being satisfactory by those people responsible for the task. The reasons vary from country to country but usually stems from under-staffing. Inexperienced people are being required to work beyond their level of self confidence.

The situation of the environmental education curriculum in Fiji is summarised by Neil Taylor (1994, 53)
"At the primary and junior secondary levels the curriculum has insufficient content on marine and forest environments which constitute two of Fiji's most important sustainable resources. The new Agriculture Science course is too advanced and theoretical for the level at which it is intended. Given the current staffing problems at the CDU and the heavy work load of the existing staff, these deficiencies are unlikely to be remedied in the near future."

Unfortunately this summary applies to Tonga, Western Samoa and Vanuatu as well. The situation is more positive in the Solomons because an AusAid funded program of support for the Curriculum Development Centre is now under way.

In Tonga inputs into environmental education were disjointed. Two individual Peace Corps people and two locals were separately writing environmental units that overlap.

In Vanuatu, discussions with CDU and VTC staff highlighted the dislocation caused by the change in government. The process of curriculum writing has more or less ground to a halt. The VTC is adjacent to the CDU but staff are not involved in the writing teams.

In several instances curriculum development is dependent on organisations outside the education system and funded with external aid. For example, the German funded Fiji - German Forestry Program was producing a handbook about agroforestry for secondary agriculture teachers. Similarly, the Tongan Ministry of Environment and Planning, with aid from Peace Corps, was producing notes for secondary teachers about the environment.

In Fiji, the Komiti For The Advancement Of Nutrition and Agriculture (KANA) is making valuable input into curriculum development and teacher inservice on environmental topics Similarly, UNICEF has produced a very comprehensive resource book for Pacific teachers on nutrition and agriculture. Unfortunately, there has been no concerted program to follow up the work with teacher inservice. United Nations Family Planning Association (UNFPA) has produced "*Population: a Manual for Teacher Training Colleges in the Pacific*" (Anon 1994a) but that too has not been inserviced. The National Trust of Fiji has produced a very valuable environmental education resource for teachers entitled "*The Green Book for Fiji*". (Knox, 1990)

The Department of lands, Survey and Environment in Western Samoa is also active in producing environmental education posters and materials for use in schools and in the community .

The South Pacific Regional Environmental Program (SPREP), based in Western Samoa, is producing materials that are a very valuable resource for teachers and for writers of curriculum in the Pacific nations. These include an excellent series of teachers' guides and pupils' books on environmental topics produced by the University of the South Pacific (USP) Institute of Education. Posters, videos and teaching kits for use in schools have been distributed to schools across the Pacific. (Fuavao, V. 1994)

## CONCLUSIONS

There is an urgent need for environmental education in the Pacific. All the countries visited are facing severe environmental degradation. There is the potential for a common core curriculum in environmental education to be applied across the Pacific. Local examples should be used to illustrate the problems common all the countries. The value of endemic species to the local environment and local culture should be emphasised. There are moves afoot to develop common core curriculum for the Pacific nations and these moves should be commended and a similar approach taken with environmental education.

Excellent Pacific-wide resources have been produced by such organisations as SPREP and USP. Other national organisations have also produced excellent local materials that can be applied profitably by other countries.

## ACKNOWLEDGMENTS

Sincere thanks to those hospitable and helpful Pacific friends and colleagues who made my study leave fruitful. Special thanks to Manu Lata and Fr. David Galvin. Editorial help at short notice from Steve Hooper is especially appreciated.

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# THE AUSTRALIAN HOME GREENHOUSE SCORECARD.

## Household greenhouse gas emission estimations made easy.

[Frank Mitchell, EPA (Victoria).
for AAEE/MESA Conference January 1997, Hobart.]

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The Australian Home Greenhouse Scorecard (AHGS) provides a computerised, user friendly, way of estimating the amount of greenhouse gases generated by any Australian household. It takes advantage of the number crunching power of modern personal computers, and applies this to simple information inputs from a householder.

The program estimates how much energy and materials are used at by a household from information supplied by the householder such as: what part of Australia the house is in, how many people live at the house, how hot water is used, and what are the patterns of cooking, car use, lighting and so on. Then the estimate of energy and material consumption derived from the input information, is converted by the computer to greenhouse gas emission figures, and the computer generates a report showing the levels of production of greenhouse gases by that household.

### What is the Australian Home Greenhouse Scorecard?

The AHGS computer package is two floppy discs with user notes, all contained in a plastic binder composed of 100% post-industrial waste. The 70 pages of supporting notes include explanations of the science of greenhouse, some national and international statistics, and a wide range of teaching activities and suggestions for use of the Scorecard.

The software can run on either MS DOS and Apple computers. In addition, the Scorecard can generate a number of different hard copy reports which can assist home users in analyses of options presented by the Scorecard, and are very useful for class room activities.

### How and why was it developed?

The AHGS was developed as part of the community information and education section of the National Greenhouse Response Strategy. Schools are targeted as a way of building longer term understanding of the enhanced greenhouse effect, how individuals are contributing to it and how they could reduce their contributions. Shorter term greenhouse action is also sought by targeting home users through such places as public libraries and home advisory services, and at their own computers.

A national distribution strategy for the Scorecard package has been put in place, with Edsoft as the commercial distributor. A brochure and order form has been mailed to all Australian schools and public libraries. Posters are available for displays at teacher conferences and other point of sale opportunities.

EPA Victoria commissioned the product, managed its production by the successful tenderer Sustainable Solutions and is monitoring the progress of the distribution strategy. We were able to attract financial contributions for production of the AHGS from the NSW EPA, the Commonwealth Department of the Environment Sport and Territories (DEST) and the Australian and New Zealand Environment and Conservation Council (ANZECC).

**The Greenhouse Saver publications.**

The computerised Greenhouse Scorecard is the last of the Greenhouse Saver Publications: a series of four educational booklets about greenhouse. This was a greenhouse education program run by EPA in Victoria. The full series, all still available from EPA(Victoria), is:

| | |
|---|---|
| Home Greenhouse Saver | (booklet) |
| Work Greenhouse Saver | (booklet) |
| School Greenhouse Saver | (booklet) |
| Greenhouse Saving Office Equipment. | (booklet) |
| Australian Home Greenhouse Scorecard | (computer package) |

The Home and School Greenhouse Saver booklets in particular were very popular with schools. They were distributed singly or as class sets. Single copies were given away free on request, and class sets were sold to schools at a nominal price to cover some costs including postage. Around 200 class sets of each of the Home and School Greenhouse Savers were sold to Victorian schools.

The four booklets are Victorian in focus, however the Australian Home Greenhouse Scorecard is genuinely national in focus, with application of it tailored for the circumstances of all of Australia's States and Territories. Note that an update of the Home Greenhouse Saver booklet, with a national rather than just Victorian focus, is being compiled now by the Commonwealth Department of the Environment. It should be available early in 1997.

**What does a Home Greenhouse Score look like:**

A Scorecard is generated for individual houses as total annual emissions, and as a break down of these emissions into categories. The Scorecard also supplies a list of hints for reduction tailor made for respective houses. Note that the typical Australian household generates about 15 to 20 tonnes of greenhouse gas per year, although a household with two cars and other above average features could easily generate over 30 tonnes per year. The units of greenhouse gases are presented as tonnes of $CO_2$ equivalent.

Table 1 shows what a score for an above average house could look like.

**Table 1:** **An example of a household greenhouse gas emission score as worked out by the AHGS.**

| Activity | Emissions [tonnes of $CO_2$ equivalent] |
|---|---|
| Transport | 11.28 |
| Lighting | 1.44 |
| Refrigeration | 1.72 |
| Heating | 5.22 |
| Cooking | 2.50 |
| Hot Water | 6.65 |
| Other Appliances | 6.53 |
| Recycling | 1.31 |
| **Total:** | **36.65** |

This information can be printed out as hard copy, which displays the information as a pie chart as well as simple figures. Hints for reductions for each of the categories can be printed out as a separate report. The score is always for a whole house, but a user could easily covert this to a per capita figure if required.

## Modelling capacity.

The program can be used to model various configurations of appliances in a house, to investigate the effect of changes. The changes can be significant, such as changing the fuel of the Hot Water Service or small such as improving the efficiency of one of the household whitegoods. Other changes which could be investigated include installing insulation in the walls and or ceiling, or having more north facing windows, or using public transport more and your car less.

The program has a user friendly feel about it which is achieved by its modular approach and speed of calculation. Development of the operating interface, including the modular orientation, was the result of consultative processes involving extensive trialing at schools, public libraries, the Scienceworks Museum in Melbourne and other individual users.

The program is pre-set to model the circumstances of houses connected to the electricity grid in all Australian States and territories. The program recognises the location of a house by entry of the users post code. The main variable this identifies is the mode of production of electricity. For example Victorian electricity generated mostly from brown coal has the highest greenhouse coefficient, whereas Tasmanian electricity almost entirely generated from hydro-power gets the lowest greenhouse coefficient.

## Modular approach.

The scorecard analyses data in the categories listed in the table above. It does this one category at a time. This provides a convenient capacity to do close analysis of single features of a household, without having to complete a whole scorecard for all categories every time it is used. Some of the Scorecard categories, or modules, involve complicated analysis such as for hot water use, whereas others such as lighting or refrigeration involve simpler analysis.

**Table 2: the Modular approach for the Scorecard**

| Reporting category or module | Made up of (not exhaustive) |
|---|---|
| Hot water use | Type of hot water service<br>Clothes washing<br>Dish washing<br>Showering and bathing |
| Transport | Private transport (cars)<br>Public Transport (taxis, buses, trams and trains) |
| Heating | Main space heater<br>Auxiliary heating |
| Cooling and other appliances | Air conditioning<br>TV, electric blankets, videos, TV, etc<br>Clothes dryers. |
| Recycling | Paper<br>Containers<br>Garden waste<br>Food scraps |
| Cooking | Electric or gas cooking<br>Cooker tops, ovens, etc<br>Micro-waves |
| Refrigeration | Fridges<br>Freezers |
| Lighting | Incandescent, fluorescent<br>Compact fluorescent |

## Saving Scorecards.

The program can save any Scorecards generated in it. Any saved Scorecard can be directly compared with any other Scorecard using the program's compare facility. Saved Scorecards are available for further modelling and analysis work, and can be further saved as a modified Scorecard with the original saved version remaining in the memory.

## Comparing houses.

A feature of the program is the compare function. This means it can generate a report which will show a direct comparison between the scores of any two houses. This is done by displaying the scores of two selected houses as a histogram. This feature can be particularly useful for class work, for example where students can be asked to compare houses and explain the differences.

Two default scorecards, which can't be altered by users, are stored in the program; a green household and a typical household. The user can compare the results for their own household against these, or indeed against any other scorecard stored in the computer

## Conversion factors.

Estimates of greenhouses gases generated is based on quantitative estimates of energy and material consumption. The conversion factors, or greenhouse coefficients, are applied to these consumption figures to provide the estimates of greenhouse gases.

Most of the greenhouse coefficients don't vary across Australia. They are listed at **table 3**. Where any variation across Australia in greenhouse coefficient does occur, it is picked up when the user enters their postcode. The most significant variations are found in the coefficients for electricity (see **table 4**)

The coefficients of the Scorecard program were worked out using internationally agreed methodologies. Application of the conversion factors in the program is then a simple arithmetic process which multiplies the unit of measure of the particular consumable by the appropriate conversion factor. They are also called greenhouse coefficients.

**Table 3. Greenhouse coefficients used in the AHGS.**

| Consumable | Unit of Measure (UoM). | Greenhouse coefficient |
|---|---|---|
| Petrol | litre | 2.46 |
| LPG | litre | 1.67 |
| Diesel | litre | 2.93 |
| Electricity | kw/hour | 1.30 (Vic) |
| Gas/LPG | MJ | 0.006 |
| Coal | kg | 2.62 |
| Wood | kg | 0.03 |
| Briquette | kg | 2.62 |
| Oil | litre | 2.85 |

Conversion is from UoM to kg $CO_2$ equivalent. For example, the use of 5 litres of petrol generates (5 x 2.46) or 12.30 kg of $CO_2$.

## Greenhouse Coefficients for Electricity

Most electricity used in Australia is supplied from state based electricity grids, which is distributing electricity generated at large centralised power stations. The predominant energy source for electricity generation varies from state to state. For example, Tasmanian electricity is mostly generated from hydro power, whereas Victorian electricity is mostly from brown coal. The Greenhouse gas emissions (mostly as $CO_2$) generated in each case will be very different. (see table 4)

Tasmania will have a very low greenhouse efficient because of its predominance of hydro-electricity, whereas Victorian electricity will have a high greenhouse coefficient because most of it's electricity is generated using energy released by the burning of brown coal.

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The greenhouse coefficients built in to the AHGS are those relevant each of the Australian States and Territories. The coefficients tend to be the same for most energy and material use across Australia. However, the coefficients for electricity will vary depending on how the electricity is generated.

**Table 4. Greenhouse coefficients for electricity use.**

| **State/Territory.** | **Post-code series.** | **Greenhouse coefficient.** |
|---|---|---|
| NSW | 2000 | 1.04 |
| Vic | 3000 | 1.30 |
| Queensland | 4000 | 1.01 |
| South Australia | 5000 | 0.98 |
| West Aust | 6000 | 1.10 |
| NT | 0800 | 0.69 |
| ACT | 2600 | 1.04 |
| Tas | 7000 | 0.06 |

Conversion is from kilowatt hour of electricity, to kg of $CO_2$ equivalent.

### Customising the greenhouse coefficients

The Greenhouse Coefficients can be changed in the AHGS to reflect unusual circumstances. For example, to calculate greenhouse gas emissions from a solar house or for a house where the electricity comes from a petrol or diesel powered generator.

The most likely need to customise the coefficients is for electricity use, however, other greenhouse coefficients can also be customised for individual scorecards. This could be useful for example in investigating the use of a low greenhouse impact car fuel.

### Other variables.

Other than the greenhouse coefficients, the most important variables are location in Australia, and number of people in the house. Location in Australia as specified by entry of post-code, is used to specify the greenhouse coefficient for electricity and some climate dependant parameters, such as size of hot water services, and so on.

The number of people in a house is obviously important as each additional person will increase the use of hot water, cooking, and so on.
The Scorecard can also take into account such things as the size of the house, the presence or otherwise of insulation in the walls and ceiling, the size and orientation of windows, how much recycling is done by the occupants, and so on. Each of these variables can be altered to immediately see the impact on the greenhouse gas score for the house. A particular strength of the program is its capacity to model the effects of variations in household configurations.

### Supporting Notes.

As indicated earlier there are 70 pages of supporting notes. These provide simple and clear explanations of the science of greenhouse, instructions on loading of the program, suggestions for use of the program by home users and by professionals in the home advisory field. There is also a series of activity sheets for use by schools.

Also included as hard copy is a hard copy set of the data entry questions that users complete as they use the software. This is particularly useful for school based activities where the teacher could set homework assignments involving data gathering at home by the students. All of this material is photo-copiable.

### The National Greenhouse Response Strategy.

The NGRS was agreed to by all Australian governments in December 1992 as a four year strategy. It is currently under review. This extensive review is considering all aspects of the strategy in order to have a new strategy in place sometime in 1997. At this stage of the review it is clear that information and education programs will be an important part of the new strategy, and educational initiatives which have a national focus such as the AHGS, rather than a limited regional focus, are likely to be encouraged in the new NGRS.

### Feedback

Any feedback from users is encouraged. Comments about the program, including suggestions for improvements or other criticisms, are welcome. I can be contacted on 03 9628 5974. Comments could be mailed to me at EPA(Victoria): Frank Mitchell, EPA, 477 Collins Street, Melbourne, Victoria, 3000. Or sent by e-mail. frank.mitchell@epa.vic.gov.au

### Further information about the AHGS.

Any queries about purchasing of the product should be addressed to Edsoft who have a toll free number 1800 338 873. Queries about the nature of the product or other greenhouse publications should be addressed to EPA(Victoria) on 03 9628 5622.

The Commonwealth Department of Environment Sport and Territories, also distribute greenhouse education materials free of charge. Their Community Information Unit can be contacted on a toll free number 1800 803 772.

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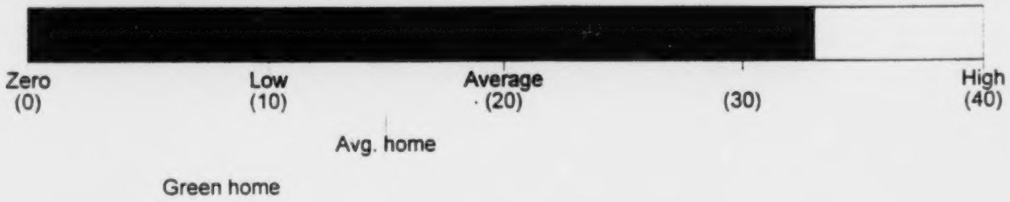
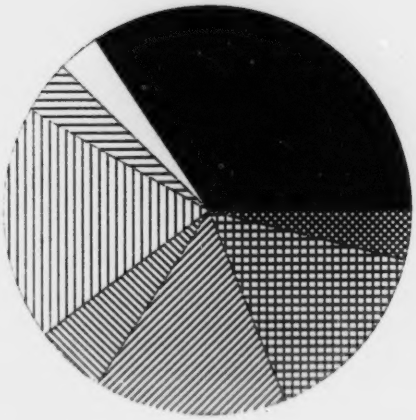
# HOME GREENHOUSE SCORECARD

## YOUR OVERALL GREENHOUSE RATING - 33.02 TONNES PER ANNUM





| | | |
|---|---|---|
| ■ | Transport | 11.28 tonnes |
| □ | Lighting | 1.08 tonnes |
| ▤ | Refrigeration | 1.39 tonnes |
| ▥ | Heating | 6.17 tonnes |
| ▧ | Cooking | 1.87 tonnes |
| ▨ | Hot Water | 4.96 tonnes |
| ▦ | Other Appliances | 4.96 tonnes |
| ▩ | Recycling | 1.31 tonnes |

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**File: Wayne**

**Household**
4 Person household in NSW (2600)
**Transport**
vehicle ( 13 l/100km), non cfc aircon, auto, 15000 kms/yr; vehicle ( 13 l/100km), non cfc aircon, V8/4WD, 15000 kms/yr
**Public Transport**
taxi: 0 trips/wk of 3 kms; bus: 10 trips/wk of 3 kms; train: 0 trips/wk of 3 kms; tram: 0 trips/wk of 3 kms
**Heating**
160 m2 home, ceiling insulation, main: nat gas/lpg; other: elec fan/radiator
**Refrigeration**
2 door fridge large, unknown rating
**Hot Water**
unknown rated elec
**Bathing**
0-5 std shwrs of < 3 mins; 20 std shwrs of 3-6 mins; 0-5 std shwrs of > 6 mins
0-5 eff shwrs of < 3 mins; 0-5 eff shwrs of 3-6 mins; 0-5 eff shwrs of > 3 mins
0 shallow baths; 0 half full baths; 3 full baths; 0 large/spa baths
**Clothes Washing**
medium top loader, normal cycle, over 6/wk, warm wash, unknown rating
**Dish Washing**
dish washer over 6/wk, normal cycle, unknown rating, unknown taps, rinsed sometimes; 0-5 sinks/wk
**Lighting**
2 incand; 2 fluoro; 0 compact; 7 low volt.
**Cooking**
elec cooktop, over 8/wk; elec oven, 4-8/wk; elec griller, 1-3/wk; elec m/wave, over 8/wk
**Other Appliances**
unknown rating dryer, 1-3/wk winter, 0/wk summer
ceiling fan refrig. A/C
tv1: 5-10 hrs/day; tv2: 1-4 hrs/day; pc: 1-4 hrs/day; elec: 0 kwh; gas: 0 mj; pool pump; video; elec. jug
**Recycling**
recycle over 1/2 paper, over 1/2 containers, compost over 1/2 garden waste, over 1/2 food waste

BEST COPY AVAILABLE

# Roundup of Marine Education around Australia

by
Bob Moffatt
B.Sc. Dip. Ed. Grad. Dip Ed. Admin.
Partner in the firm Wet Paper Publishers and Consultants
14 Milbong Tce Ashmore 4214

A paper presented to the AAEE Hobart Conference 13 - 17 January 1997

## Summary

This paper is a first attempt to describe Marine Education in Australian schools, colleges and other education associations. The paper outlines a brief history of Marine Studies initiatives by Marine Teachers since 1975 and surveys existing Australian syllabi giving examples of how schools have developed programs in four Australian States. The paper lists some Marine Studies National Curriculum modules being considered by the Queensland Marine Studies Syllabus committee in the rewriting of their syllabus to embed vocational aspects and discusses future directions in vocational education in Marine Studies. A full version is available on: www.wetpaper.com.au

## Introduction

Perhaps the greatest change came about when the Schools Commission in the mid 70's introduced the innovative grants scheme. This scheme had enormous consequences for Marine Studies education in Australia. Some of the things I can remember happening were in Western Australia, where it helped start the expedition boat shed and a sail training ship. In Tasmania, it funded the renovation of an old scallop shed that was transformed into a Marine Studies Centre. In Victoria, it helped with the establishment of marine programs in field study centres In South Australia it funded a curriculum program called FUSE - For Unified Science Education, which produced possibly the first flexible curriculum unit in Marine Studies called Oceanography. In Queensland a boat and marine equipment were purchased by a local school, field study centre to run the Gladstone Oceanographic Studies Program - GOSP project. A small ferry was built by a special school at Darling Point so intellectually disabled children could teach main stream children navigation. In New South Wales schools were taking reef trips as part of their Biology courses and in-service education flourished in schools In the Northern Territory, the Channel Island Field Study Centre became the focus for Marine Education with mangrove mania and other projects developing with local schools and community groups.

The later seventies and early eighties set the foundation for Marine Education in Australia and with the introduction of the Secondary Transition Education Project or STEP program. Courses in Marine Studies began to appear with activities such as:- Students working in boats getting speed boat drivers licences at school, snorkelling and SCUBA courses as part of main stream curriculum, commercial radio licences being issued to high school students from TAFE programs, TAFE teachers teaching in high schools and students going to TAFE in school time , conservation management activities and excursions to new marine parks, coastal studies of local sand movement patterns, students working on water quality of local coastlines, students going to field study centres for day or overnight programs, fishing and fisheries technology as part of the curriculum, students learning how to repair outboard motors, classroom navigation and links with TAFE

## The PEP Program

For Queensland, this program was an enormous boost for our marine schools. The teachers were given the opportunity of voting for in-service or equipment and they took the later with some schools spending up to $15,000 on boats and equipment. Les Sampson from a centrally controlled office administered the marine studies schools on a state wide basis. Some schools got together to form a committee such as the Mackay Group. They pooled their PEP money and bought a common set of equipment. The groups elected a co-ordinator and a combined boating program began with each of four schools sharing the equipment for a term each. The schools allowed for a network co-ordinator who took on the responsibility for maintaining the equipment and running local seminars. Bill Keid, Greg McGarvie and Peter Hamlyn have played a leading role in this group. Then there was the boat at the Wide Bay Regional Office in Queensland that was used by Regional Inspectors during the rainy season (when Regional Inspectors were tough). The local PEP co-ordinator who went fishing with the inspector commandeered the boat which is now still known as PEPI. The boat is well loved and symbolises the project in that region. The co-ordinator was Dave Claridge and as a PEP co-ordinator he had an office and phone. Dave would organise local meetings and seminars so that teachers could get together to discuss marine issues and swap ideas. Out of these seminars was borne an enormous friendship and philosophy of sharing. The teachers stayed in a caravan park and the seminar was at the Yacht Club. The teachers did a deal to give up their weekend if they could have the Friday off to go. Fridays were spent on aspects of syllabus development, work programs and swapping worksheets while Saturday and Sunday spent on such issues as fishing, seafood cooking, marine catering and fisheries technology - in other words we drank rum and coco cola while catching and eating fish. But you know, more was done in those informal networking sessions than anything else.

The teachers discussed what motors they bought and what deals they got. Things like trading in motors for a nil turnover after 12 months must have by now saved thousands of dollars from their budgets. The PEP program also allowed for a Marine Studies Co-ordinator to travel around Queensland and run seminars to introduce the topics and provide ideas for school programs. The program provided schools with the opportunity to buy curriculum resources form the Brisbane South Marine Studies Project which is discussed later.

## Marine Education Curriculum materials are home grown

It should be noted that curriculum development in Biology, Chemistry and Physics was largely imported from the USA. We all saw the BSSC, CHEM Study and Physics modules come out. Millions were spent by the USA in developing their curriculum and for curriculum developers in Australian to have such a great model to follow, was a boost. What really makes you drool, is the little things like all those 16 mm movies that were produced in full colour, the teachers guides with sample exam papers and resources, full colour textbooks, government funded in-service programs for teachers. Our navigation videos began from a little studio in Mackay with a Science Subject Master on his weekends and a local video small business. our teachers guides have been written by ourselves in the staffroom after hours. our textbook were produced from a home business on a house mortgage. However, we have one of the most innovative marine education programs in the world of which I have been proud to be associated with. The vast majority of students in the USA cannot study boating or snorkelling as part of normal school. (Todd Hendricks in Hawaii is one of the few I know of who teachers boating at school.) The richness of the marine environmental education experience in Australia with its climate and relatively unpolluted environment, coupled with the dedication of its Marine Teachers has made us world leaders. Many marine teachers have gained a new lease of life after 40 by marine studies and to their credit, have developed a subject that is worthy of national recognition. The type of course will depend on the subject area or staffroom in which the teacher works. If we know that a course had its roots in manual arts, then we will see boat building, fishing, small motors, navigation and other practical elements taking preference. On the other hand if the course was started by the Science Master, a different approach will occur. But let us not forget that both Science and Manual Arts graduates both have career paths and equally is important. I have seen marine studies taught by Phys Ed, Science, Geography, English, Manual Arts, Maths and Performing Arts. Each does an equally good and valid job and each can contribute to the vocational education of our students. Marine teachers tend to bring their weekend into the classroom. That's what they like and there is nothing better to be able to teach something that you like - an you know a bit about.

## Roundup

So I would like to round up the Australian Marine Education scene with a quick look at some of the history of Marine Studies. It's very difficult to get it all or even half with a limited budget, but this what I have dug up from my slide collection over the past 25 years. More is discussed in the Wet Paper Web Page.

### Western Australia

The expedition boat shed was the first of its kind in Australia, this was and still is the first centre for boating education in WA. What was originally from a schools commission grant, the shed was associated with a sailing vessel - the Vivian of Straun. Teachers from the Outdoor Educators Association of WA have long been involved with the concept of sea trekking in their marine education programs and the types of craft and skills required has fashioned the shape of boats and equipment used in class. As well, the Science Teachers Association of WA has lead the charge to put marine studies firmly on the agenda and the Science of Boating is one example that will be referred to later.

### South Australia

Marine Studies in SA has a long history in Science. The publications above and below high water and marine aquarium by John Smith and produced by the South Australian Education Department were examples of how this state ran its curriculum program. In the early eighties, many of us were inspired by the curriculum initiatives SA took and the quality of their work was excellent. The FUSE or for unified science education produced a unit on Oceanography by Roy Jenkins which introduced the idea of taking many difference subject materials and schools in the 1970's developed work programs around rocky shore units and marine biology activities.

### Tasmania

In the early 1970's a schools commission project began where an old scallop shed was converted into a marine studies classroom by a schools commission grant by Allistar Martin - an energetic young teacher from Woodbridge . The fisheries department gave an trawler and skipper and students from local schools could make bookings for day visits to learn oceanography, navigation and marine biology skills to supplement existing programs in schools. Teachers had the opportunity to visit the centre and learn about the programs before bringing students for a days visit. A standard set of work sheets were prepared the vocational aspects of which that included - An introduction to wheelhouse instrumentation, Fishing gear technology, Shark long lining, Navigation, Aquaculture and Basic mariners skills.

### Marine Studies in Victoria

There is no syllabus in marine studies in Victoria and very scant literature. Most students study academic curricula to year 12 and then students can make decisions about career choices in marine studies in technical or applied areas and it is very hard to put a figure on how many students study the sea in Victoria. I have no contacts with VIC-TAFE as yet. However students have the opportunity to study marine science in the P-10 area through the CSF (the Victorian version of the National Curriculum called the Curriculum Standards Framework). Thanks to

Gayle Seddon from the DSE, I have been able to locate areas in science strand science strand called biodiversity, change and continuity where students are able to study the following topics as they relate to the sea: Living and non living features of the sea, Changes in the sea, Similar and different species, Endangered species of the sea, Classification, Evolution of the sea, Marine bio-diversity. I rang David Wailes an old friend who runs many marine programs and he told me that in the Senior School, 70% of Marine Studies was done in Science courses - mainly in Biology where students studied for their Victorian Certificate of Education. Marine Studies can be studied for university entry in the Victorian Certificate of Education VCE Biology.

### Marine Studies in New South Wales

At present Marine Studies in NSW is under review. The structure of the current content endorsed curriculum is such that Marine Studies can be studied as either: 1 unit course in year 11, a 1 unit course in year 12, a 2 unit course in year 11, a 2 year course in year 12, 1 unit course in years 11 and 12 or 2 unit course in years 11 and 12. The current Marine Studies course is taught in over 120 schools with an estimated 5000 students and Junior Marine Studies is begin introduced into he curriculum in 1997.

## Queensland Marine Studies

Historically Marine Studies began in the early 70's with changes in curriculum following the abolition of external exams. This allowed for new syllabi to be written by a newly created Board of Senior Secondary School Studies or BOSSS. An added bonus involved the setting up of field study centres that specialised in marine studies. Jacobs Well, Boyne Island and Holloways Beach played vital roles in supporting schools with many valued resources in the 80's and 90's. Special Schools such as Darling Point built boats and specialised in teaching high school students navigation and rope work. In the late 70's a new syllabus called Multistrand Science was introduced by the Board of Secondary School Studies which allowed great flexibility to the teaching of traditional science subjects. Mathematics changed to incorporate new ideas in navigation and physical education was expanded to include the teaching of first aid and resuscitation as well as snorkelling and outdoor education - which saw many camps organised to offshore islands and reefs. Geography syllabi changes to allow a flexible unit approach and many schools adopted marine studies as part of their program. The Gold Coast and its development, has been studied by geography students from around Australia. A schools commission innovative grant in 1988 provided the crucible for development of fledgling ideas in marine science in Gladstone in Queensland Central coast. The Gladstone Oceanographic Studies Program (GOSP) and the Science Teachers Association of Queensland assisted the program by producing a number of marine science teaching modules. These included topics such as navigation, snorkelling, coastal physics, estuarine chemistry and fisheries biology. Between the years 1982 - 1984 the Brisbane South Marine Studies Project emerged from the STAQ modules and began publishing its own notes and curriculum materials. Greatly supported by the Department of Education Regional Office. Ten curriculum units were prepared and in-service education moneys were made available to promote and develop the modules. A regional inspector called Cyril Connell made possible many changes by encouraging principals to do marine studies. Cyril was a great ambassador for marine studies and now in his retirement, is a spotter for the Brisbane Broncos. He was a man who loved children and education and was cemented the notion that career paths could be enhanced by TAFE/Secondary links. A syllabus and sample work program was prepared by the Queensland Education Department under the Secondary Transition Education Project or STEP scheme. Jim Leech from the curriculum branch of the Education Department commissioned a number of curriculum projects and the syllabus and sample workprogram in marine studies was the lever to make it all happen. The vocational importance of marine studies was recognised early with students getting boat licences, radio and diving tickets and with the emergence of Ecotourism the importance of a working knowledge of marine animals and plants.

## Australian Maritime College

Australian Maritime College- In the mid 80's, the Australian Maritime College was established in Launceston and quickly established itself as being the centre for maritime training, education and research. With massive injections of funds from the Federal Government, all aspects of shipping and fisheries education, maritime business, seafaring, seafood handling, gear technology, engineering and naval architecture are offered by AMC. The contribution of AMC to Marine Studies education in Australia has been fantastic.We now have a centre from which we can learn from the best practices in the world. A scan of the programs on offer and the depth of vocational training is beyond the scope of this paper and needless to say the representatives from AMC can demonstrate what programs are on offer. AMC has established a National Consortium of Marine Teachers. The function of this consortium is to:- develop a data base of teachers who teach marine studies around Australia, focus attention on marine studies in Australia, attempt to draw the best students to AMC from Australian classrooms? assist in the promotion of marine activity and maritime career paths, assist with developing national marine modules which can be taught in classrooms around Australia, forge links between the secondary, vocational and higher education sectors.

### Marine Studies at South Fremantle High

Marine Studies co-ordianted by Alan Wolfe is a special course at this school which runs over a number of subject areas. Courses can be taken individually or as part of a specially tailored pathway, both in years 8 - 10 and or years 11 and 12. The school has a Web Page htt://www.cowan.edu.au/ecawa/sfshs/sfshs.html which is a real boost as you can scan the courses available at the school. The school also has a colour brochure for its Marine Studies course - well done Alan. A fleet of boats located at Fremantle Fishing Boat Harbour, Surf Cats at Jervise Bay Yacht Club surf skis and an extensive range of snorkelling and scuba equipment make up South Fremantle SHS's equipment. The timetable is structured to allow the formal study of marine related units in science and social studies while also enabling students to undertake electives in the area of design and technology. The physical education department at the school specialises in outdoor education with sea trekking, sailing, canoeing, snorkelling and marine archeology as specialist areas. Science offers students a pathway through senior science and focuses on the topics ecology of local marine environments, adopt-a-beach scheme, oceanography, marine biology and water pollution. The design and technology department offers elective units in small boat construction, boat handling and safety, boat repair and navigation and offers pathways through the nautical studies syllabus. An annual excursion to Ningaloo reef is conducted where skills gained at school are used to study environmental problems in conjunctions with CALM. There is an ongoing research program investigating the effects ad spread of the Drupella snail on this reef. Other research projects include water quality monitoring for the Swan River management authority and surveying work for the WA Maritime Museum. Close links with the WA fishing and aquaculture centre has enabled students to contribute to this exciting area of science and technology where work experience is an integral feature.

### Marine Studies in Broome High School

Geoff Bunn co-ordinatess a two year senior science course in Marine Studies. In year 11 his students study first aid, oceanography, marine biology, water quality monitoring and pollution, meteorology, maritime history and marine archeology. Activities in year 11 include completing a senior first aid certificate, studies of local waves, currents and beaches, quarantine problems, ballast water, biological identification of marine organisms, studies of abattoir effluent at Roebuck Bay, local wrecks and weather. In year 12 aquaculture, marine ecology, diving studies, boating, navigation and conservation and management are studied. Activities in year 12 include projects on the local aquaculture industries including pearls, crabs, crocs, trochus, barramundi and red claw. Marine ecology involves students in a case study and use of environmental impact statements, while diving involves SCUBA training and open water snorkelling certificates. The boating modules involve certification in small boat proficiency certificate and a RROCP radio licence. Students study the local fishing industry as a case study. Finally, management planning and legislation of marine parks completes the course where vocations such as marine park ranger and environmental health officer are examined. First aid is a prerequisite for all other modules and needs to be completed to a pass level before other modules are commenced and Marine Biology must be studies before aquaculture. Wet paper has 50 schools on its marine studies Western Australia data base in either nautical studies, senior science, physical education or outdoor education.

### The fishing industry pathways (FIP) course- South Australia

According to Phil Obst, this course is in secondary schools and provides training for students wishing to enter the fishing industry work force and is complementary to other tertiary education courses and traineeships. The course was developed to mould into South Australian Certificate of Education criteria therefore students who successfully pass Fishing Industry Pathways (FIP) courses or modules in stages 1 and 2 for years 11 and 12, will receive their SACE certificates.

### Victor Harbour High School

At Victor Harbour High School the Marine Biology Course was developed as a variation of the SSABSA SAS Biological Science Course by Ian Milne. It is presently taught by Greg Wirth. This course consists of a study of the classification and ecology of marine life. It includes instruction in the skills necessary for the study of marine life and systems. (Snorkelling, water testing, aquarium keeping, field study techniques etc...) It also contains as a major field assignment, a study of one small part of the local ecosystem; the biota present, human and natural impacts on the system etc... Victor Harbour High School now also offers the SSABSA Maritime Studies course. This is also a SAS course.

### Marine Studies at Benowa SHS

Marine Studies is done as a board and non board subject. The non board subject is called marine education. At its peak, over 200 students studied the subject with four classes in years 11 and four in year 12. The school has its own set of boats and the subject is organised under its own subject area with timetabled time given for co-ordination. Initial finding came from the PEP scheme, which saw money available to increase the number of students who wanted to finish 12 years of schooling. A storage facility was built to accommodate five boats and motors which were placed on a trailer A classroom was dedicated to the subject and storerooms were allocated for camping, fishing, marine radio, snorkelling gear and motors.

### Marine Studies at Hervey Bay State High School

Phil Smith and John Lamb co-ordinate a program at Hervey Bay SHS set up by John Howard some three years ago. The school does the BOSSSS Marine Studies course for 220 hrs and has six boats, a storage shed, marine radio, snorkelling and navigation equipment for class set use. In semester one the school studies aquatics and navigation while in semester two the following syllabus topics are covered - non living aspects, commercial applications 1, living components and marine communication. In year 12 the students study the second sections of a marine communication and commercial aspects topics. Thirty seven hours of boating is done as is 14 hours of fishing. A major unit on management and conservation is done in semester two of year 12 as is a three day field trip to Lady Elliot Island. In addition, three full days of field trips allow students to gain practical experience in fish processing, practical navigation, mangroves, marine retailing (at the boat show), snorkelling, practical fishing, bronze medallion, boat licence, first aid. The school participates in a local five school marine Olympics competition as Phil will explain in his talk.

### The AYF

Many school boating courses had their origins in Australian Yachting Federation - AYF with the TL1, 2 and 3 schemes predominating. TL means training log and logs 1 and 2 are sailing, with 3 a course for people who already own a speed boat and want to learn to use it better.

### The Marine Discovery Centre - Queenscliff Vic

This centre stated in Queenscliff as a relocatable shed and was operated by the Victorian Institute of Marine Sciences. It was set up by Laurie Hammond in the early 80's and has served as a lighthouse project for other marine centres in Australia. The concept for a Marine Educators Association of Australasia was formed in 1984 at a gathering of about 15 - 20 teachers and university lecturers.

### MESA

In 1985, the Brisbane South Marine Studies Project organised a conference at Lennons Hotel on the Gold Coast to which over 100 teachers, government officers, navy personnel, TAFE and University lecturers from around Australia attended. We heard of the achievements of teachers in their classrooms and voted to form the Marine Educators Association of Australasia. Working groups set to shape the association and by 1986 MESA was up and running with and the first ever Seaweek run by Greg McGarvie the then Vice President. Teachers were the backbone of MESA in those days, but in the mid 90's, the association passed over to the Great Barrier Reef Marine Park Authority and since then has become a loose assemblage of people who work in government agencies some of whom are teachers. MESA runs annual conferences in association with the Australian Association of Environmental Education.

### Marine Teachers Associations

The Marine Teachers Association of Queensland was formed in 1993 at a gathering of over 65 teachers on Stradbroke Island. This teachers association was formed to co-ordinate teacher activities in the state and organise competitions between schools. Teachers wanted to be able to swap worksheets and network with other teachers at a time that suited them as well represent the specific needs to new government legislation in the areas of workplace health and safety and qualifications. The association has held its first state conference and has begun a magnificent competition for school students - the Marine Olympics which Phil Smith will tell you about. A second state conference on Ecotourism and Marine Life is being organised by Greg McGarvie in Mackay this year with a trip to Brampton Island and the snorkel adventure trail.

Marine Teachers Association of NSW was formed in 1996 with similar ideas to those of Queensland. MTANSW now has over 80 members and has held a conference at Ballina and is at present rewriting the Marine Studies Syllabus in NSW.

In Western Australia - WAMTA has formed with 90 financial members, a newsletter and a conference planned for Albany next year. It holds a register of units taught by teachers and plans in-service activities for 1997 in Marine Science and Marine Studies.

### Surfrider Foundation

Founded in 1991, this association seeks to change attitudes of all Australians about he beach environment. It has played a major role in ending sewage ocean outfalls in many beaches.

## And then there is Wet Paper

Founded in 1987 by business partners Bob and Paula Moffatt, Wet Paper set out to publish, network and distribute curriculum materials for marine educators as well as promoting the need for conservation and management of the sea. Paula Moffatt chose the name which means - the ink is barely dry before the curriculum materials are in use. Bob Moffatt is the manager and in the early days did all the writing while Paula kept her job in TAFE to put food on the table. Sounds like a familiar small business scenario! For two years the firm published four booklets - Classroom Navigation, The Barrier Reef World and Coastal Studies. In 1990 Wet Paper began

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the process of preparing curriculum materials for this syllabus. A small consultancy team was formed and the enormous task of writing materials began. The team consisted of teachers, university lecturers, industry associates, friends and family. The old Macplus was replaced by the new Mac 11 series and prepress materials were purchased. A new house had to be built to accommodate a teenage family and a fledgling publishing business. Loans were raised by means of mortgages and odd consultancy jobs. In late 1990 the team of volunteers had risen and the full list of those who helped create the book is appendixed on the web. In 1991, 8000 copies of a textbook called Marine Studies rolled of the presses and five years on we have just about now sold out. The book was edited by my mother, marketed with the help of my children and printed by a good friend in Brisbane. There are some classics in the book, as many of you will now realise but it was a first go inspired by a desire to see a book teachers from around Australia could use to get their subject off the ground. In 8000 copies sold, we have had 1 letter of complaint, but with the offer to help with rewriting and proof reading - I'll be taking the offer up. Chapters included boats and equipment, outboard engines, small craft safety, navigation, small craft handling, navigation and communication at sea, chart work, tides and weather, marine communications, personal water skills and the marine environment, skindiving, managing marine accidents, oceans, coastlines, sea water quality and pollution, living aspects of the sea and commercial use, plankton, nekton, benthos, marine ecosystems, aquaculture, management of the sea and coastal zone, management and conservation and a environmental game chapter called Whale Bay. In 1991, a group of teachers got together and with the permission of the Premiers Office, published a set of exam papers for the trial syllabus. Between 1992 and 1994 Wet Paper published the reference books - Mangroves in focus, Marine pollution, WaterWise and two TAFE publications - motor mowers and caring for your car. Finally, in 1995 Wet Paper published two student manuals - Mariners Skills and the Marine Environment to accompany the textbook. Mariners Skills provided student activities for boating, snorkelling, marine radio, sailing, dangerous marine creatures and navigation. The Marine Environment manual provided activities in oceanography, marine biology, commercial uses of the sea as well as management and conservation. Since 1989, over 1900 pages have been produced with the support of school teachers who valued those pages enough to buy them. (As an aside not one of those pages was funded from a government grant). The richness of the exercise is that our family has made hundreds of really good friends and who have stayed with us as well as we within them. When you boil life down, your family and friends are more important than success. However if you can combine the two - you are truly blessed.

## Conclusion

The future of our oceans depends on the values of our land living nation and undiscovered fields such as performing arts can play an enormous role in shaping values of this nation. Marine Studies has to extend to the arts and media studies where high quality film and TV needs to concentrate on the link between the land and the sea. Innovation is not new. We can look at how money was spent in the past and what was of value. Also its worthwhile looking at who the money was spent on and how it was used. Money spent on people who use it for self promotion and then move on leaving their project to die, are not worth spending money on.

However money spent on people who set up programs, stay in contact them and follow through after promotion is well spent. Investing in people - Australians greatest natural resource is a worthwhile endeavour. What's even more worthwhile is supporting those who stick to their task and continue it on.

## Full version

This paper is an abridged version of a 32 page document which will be available on Wet Paper's home page at: www.wetpaper.com.au.

# Streamwatch- Wetter Than Life Itself
## The evolving strategies of running a large environmental education program in Western NSW: A Streamwatch Perspective.

Justin Nancarrow
Regional Streamwatch Coordinator
Murray, Murrumbidgee and Lower Darling Catchments
Department of Land and Water Conservation, Leeton
New South Wales

## SUMMARY

Streamwatch is an environmental education program that represents a combination between environmental assessment and education. Traditionally, it has focused on involving schools and the community in regular water quality monitoring programs. It then uses this water quality information as a way of educating, empowering and encouraging the community into action whilst also promoting higher levels of environmental literacy throughout the community (Hazen, et al., 1991).

Within an environmental education and resource assessment program where success is dictated by the ability to educate and empower the community into action, increased program demand has meant that the adage of working smarter not harder now applies more than ever. In the face of unprecedented growth throughout the last two years the Streamwatch Program in the Riverina area of NSW has undergone some amazing changes. The program has evolved to the point where in order to satisfy the demand **and** maintain the quality of the program, efficient and cost effective strategies to help effectively identify and then empower the target audiences have become crucial. If the program fails to accurately distribute its available resources then it risks promoting messages that either patronise or overwhelm the target audiences and if this occurs then empowerment and action become fleeting concepts.

## INTRODUCTION

The Streamwatch program has had to continually evolve both on a regional and state-wide level to embrace the philosophy of environmental education for everyone. On a regional level this process of evolution, which has largely been a reflectionary evolution, is crucial to maintain the public credibility, political favour and the educational and scientific validity of the program. Consequently, within the Riverina the program has developed in different ways to the Streamwatch programs in the other country catchments of New South Wales- as the other regions have to the Riverina. These adaptations aim to encourage a program that remains as relevant to the particular environmental issues, target audience education levels, community demands, coordinators' interests and multi-cultural mixes within a particular region as possible.

## SETTING THE SCENE

### *The Streamwatch Program in the Riverina Region of NSW*

The Streamwatch program forms the New South Wales component of the National Waterwatch program and is managed in country New South Wales by the Department of Land and Water Conservation.

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The Riverina region has two full time Streamwatch Coordinators centrally located in Leeton and a number of officers that have Streamwatch and/or environmental education as a component of their workplans throughout the Riverina.

Within the Riverina the Streamwatch program has been running for the last five years and at the present moment there are **142 groups involved in the program at varying levels throughout the Riverina Catchment.**[1] This represents a steady increase in the numbers involved in the program since its inception in 1993 (see figure 1).

The groups are made up of a mixture of primary and high schools, Landcare groups, farming organisations, long-term unemployed groups, universities, special interests groups, pre-schools and disabled groups. The majority of the groups that the program deals with are primary schools with the remaining bulk being either Landcare groups or high schools.

The groups are predominantly located in the eastern part of the Murray and Murrumbidgee catchments. This reflects the demographical distributions and the areas where there are greater amounts of available grassroots support, for example, established Landcare groups, Field Study Centres and Universities, within the region (see Appendix 1).

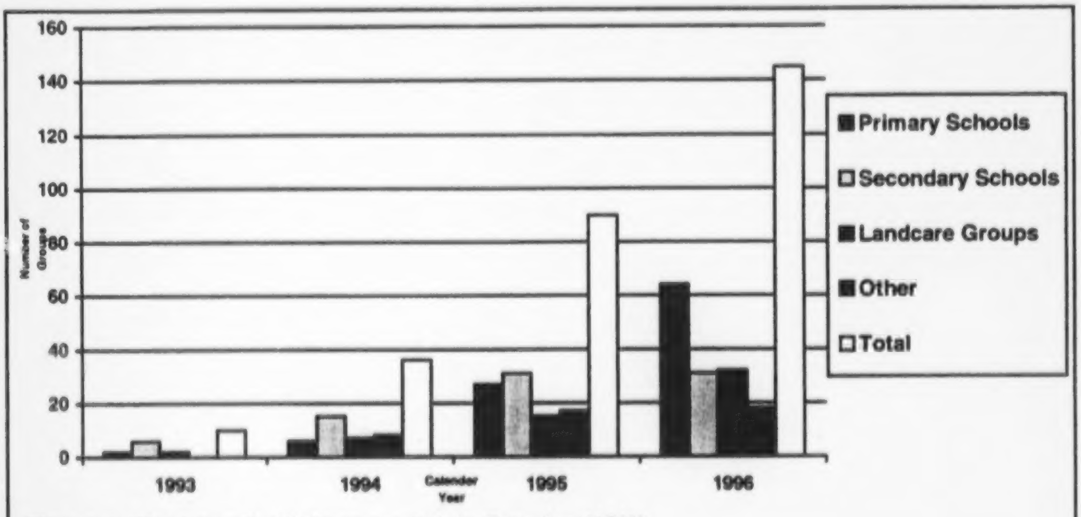

*Figure 1. The Growth of Streamwatch in Riverina NSW*

### *The Riverina Region of New South Wales*

The Riverina area stretches from Dareton in far-western NSW across to Cooma in the east. The southern boundary of the region is dictated by the New South Wales/ Victorian border and the Murray River, whilst the northern boundary stretches in a rough line from Pooncarie on the Lower Darling across to West Wyalong and then onto Yass (see appendix 1).

There are essentially three catchment areas that are included within the Riverina area; the Murrumbidgee Catchment, the New South Wales side of the Murray Catchment and, finally, the Lower Darling Catchment. It is a region that represents a combined catchment area of approximately 203 370 sq/km or approximately one-third of New South Wales (Window on Water 1994/95, DLWC, 1996).

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[1] For the purpose of this paper, a Streamwatch group is defined as an organisation or group that has consistently been involved in some aspect of the programs that have been run by Streamwatch.

This area contains an enormous amount of varied land uses, environments and contrasting demographic concentrations which in turn have significant effects on the way in which the program is run. For example, the large urban and regional centres such as Canberra (260,000 people), Albury (46,000 people) and Wagga (47,000 people) call for different management strategies compared to areas of lower human concentrations, such as the lower human populations found in the lower Murrumbidgee catchment.

## THE TOOLBOX APPROACH- MAKING ENVIRONMENTAL EDUCATION AS EASY AS POSSIBLE

### The Toolbox Method- Introduction

The toolbox approach characterises the epitome of the way that the Streamwatch program in the Riverina is run. An approach that incorporates similar, consistent themes whilst still allowing for bio-regional adaptations is essential considering the huge variety of environmental issues, logistical limitations, education levels and multi-cultural mixes throughout the region.

Groups have the ability to choose what parts of the program and at what level of involvement suits them. For example, a primary school might not be interested in regular water quality monitoring but the bi-annual Water Bug Surveys might suit their environmental issues and logistical limitations.

In addition, Streamwatch in the Riverina region has tried to combine and adapt a variety of regional tools to supplement the state-wide programs so that environmental education is as easy to get involved in, is in line with community demands and is as locally relevant as possible. Consequently, because these products often evolve as the result of a reflectionary process, evaluation and feedback of existing products often form the key to the creation of new products. This highlights the need to pay close attention to all of the forms of feedback and evaluation from any of the days, events or promotional campaigns that are being run so that all of the tools maintain malleability.

### Intensive vs. Extensive Education Programs

With the current amount of resources within the Riverina region a problem is created as to whether to aim the program towards an extensive environmental education program for as many people as possible or a program that channels concentrated amounts of resources into a minority of groups. By focusing only on a few intensive groups this comes at the cost of making Streamwatch available to fewer numbers of schools and community groups throughout the whole catchment.

Often to maintain political favour and financial support for programs such as Streamwatch, it is sometimes easy to concentrate on intensively developing groups so that they evolve to a standard where they can act as high publicity case studies. For example, a highly evolved group can relatively easily attract large amounts of publicity, community interest and funding relative to a group that has recently joined the program. There is no doubt that some of these "case study groups" are needed to maintain the high profile of the program. But in fostering and encouraging a group to this level the group often becomes dependent on this intensive support from the Streamwatch coordinator or other agency staff. The challenge for the program is to develop groups or localised support networks, such as spoke networks, that are self-reliant and that have the resourcefulness and independence to survive with little departmental support.

Whether having few intensive centres of excellence of Streamwatch alone are a bad thing is a matter of debate. However, in an ideal world there is no doubt that it would be fantastic to have every school or community group in the catchment evolving to a level where they all act as self-sustaining, independent "case studies" and indeed this is the dream of the program. However with existing levels of resources a balance between intensive groups and extensive programs is the optimal model and the best that can currently be hoped for.

### Catchment Education vs. Issue Based Education

From experience, many of the education programs that have been run in the Riverina have often been too ambitious in that they have tried to cover too much material for their target audience, given basic education levels, to digest. An evolution in the program to combat this has been expressed in the definite shift within Streamwatch away from educating the community only about water quality. The content of the environmental messages has had to remain flexible so that it is as relevant to the location, issues, and people as possible. Streamwatch in most cases could be more accurately described as "Catchmentwatch" as the environmental field days, events or inservices often delve into issues that relate to water quality but have more of an environmentally integrated approach than the name Streamwatch implies.

Water quality is often only the mechanism for teaching the community about a whole range of associated environmental issues. For example, looking at salinity levels in the local creek can lead to looking at land uses, native vegetation management, agricultural and urban water management, local agricultural techniques, bio-diversity, hydro-geological assessment, geology, feral animals and pest, introduced species, etc. Coordinators are required to be multi-skilled in both their knowledge of a range of environmental issues and what part these environmental issues play; not only in the local area but throughout the entire catchment.

### Single Issue Based Inservicing

Although complex environmental jigsaw puzzles, such as water quality, are sometimes difficult to translate to the community, single concepts acting as a mechanism to teach the overall concept sometimes aren't as difficult for the target audiences to relate to. For example, over the past two years throughout the Murrumbidgee and Murray catchments, and more recently over the last couple of months throughout New South Wales, a series of one-off, single issue teacher inservices have been run.

***The Scum Schools*** aimed to achieve a number of outcomes. The inservices hoped that by providing thorough technical training to teachers on a single issue, in this case blue-green algae, it would then act as a launching pad into a range of other environmental issues. However, the inservices tried to go further than this in that they also tried to provide teachers with some educationally innovative "sludge busting tools" to translate this technical information back into the classroom. The one day workshops were divided into morning and an afternoon sessions with the technical component of the days presented in the morning whilst the classroom application components being delivered in the afternoon.

The inservices were hands-on and extremely practical whilst also attempting to be as technically and educationally innovative as possible. They included a number of simple environmental teaching ideas that embraced a range of educational philosophies based on experiential learning including teaching using quadrants of the brain, advanced learning styles, vision education, cooperative learning, mind mapping, subject immersion and peer tutoring.

In addition, the teaching ideas integrated as many environmental concepts as possible as an intrinsic part of the lesson. Simple things such as using recycled materials as teaching aids, making sure that all materials that are capable of being recycling at the end of the lesson are, and encouraging teachers to use environmentally friendly language that promotes ownership and involvement within the class were all included. There was a distinct focus on leaving a better environment behind at the end of each lesson or unit of work whilst also trying to get the teachers to make sure that the environmental lessons taught are ongoing. For example, if a unit on being water wise that is taught at the beginning of the year should be carried on throughout the year.

These events were extremely cheap (approximately $800 to $1500) to run and they involved as many different people and organisations as possible. The Queanbeyan Scum School that was held in August, 1996, the event was hosted by the local councils and included representatives from the NSW EPA, NSW Department of Agriculture, ACT Department of Urban Services, Waterwatch, Murrumbidgee Clean Water Campaign, the Murrumbidgee Catchment Management Committee, and both head office and regional representatives from the Department of Land and Water Conservation.

Above all the concept of issues based inservicing was designed so that the environmental issue, whether it be blue-green algae, soil erosion, or revegetation, can be inter-changed using the same model. For example, a similar series of inservices looking at dry-land, urban and irrigation salinity, **Crust Camps**, will be run in the first half of 1997 in Wagga.

**The Spring and Autumn National Water Bug Surveys** are also excellent examples of educating using one particular piece of the water quality jigsaw. The Water Bug surveys use aquatic macroinvertebrates as stepping stone to other environmental issues and they have grown in popularity at an amazing rate since the first survey in 1995. The surveys are fun, they get people out into the field, they are very easy to do and most importantly they are extremely cheap. The equipment needed could be something as simple as a broom handle with a stocking and a coat hanger strapped to one end to form a net.

The Riverina area has seen an incredible increase in the numbers of people involved in the Water Bug Surveys over the last two years to the point where it is getting very difficult to satisfy demand. Some schools, especially the smaller primary schools, have been involved in the last four surveys and this highlights the need to continually update the curriculum materials, support handbooks and activities that go with the program so that the Water Bug Surveys stay as dynamic and as innovative as possible.

### Event Based Education

In the past Streamwatch regional conferences have annually brought together groups right across the catchment to hone skills, develop new directions and to reinforce a range of powerful environmental messages. Traditionally these conferences have been aimed at the high schools involved in the program, although there have been adaptations for councils, Landcare groups, primary schools, etc, and they have generally lasted over two or three days. Despite the fact that these conference are an effective way of reinforcing environmental messages amongst Streamwatch groups they are also, in the larger western catchments, extremely expensive. For example, the annual two day Riverina Streamwatch Conference that was held last year at Lake Hume in Albury cost the program approximately $11,500. It brought together eighty-five high school students and teachers from throughout the region, some of whom travelled eight hours by bus from Mildura to attend.

In trying to develop more cost effective strategies to achieve the same, or similar, outcomes the program has dispensed with multiple day/ night, annually run conferences in favour **bio-regional, one day events**. For example, the recent 'Bidgee Buzz and the Harden EnviroFest that were held in Griffith and Murrumburrah, respectively, drew a large number of schools together from the local area. This has the benefit of enabling local environmental issues to be looked at in greater depth than could have been achieved in the past with whole catchment conferences. Consequently, a greater level of empowerment and ownership towards the local environment is achieved. In addition, these event based field days were extremely cheap to run and because they were not as resource intensive they can be staged three of four times throughout the year, each time targeting different age groups or section of the community or looking at seasonal changes in environmental issues.

The 'Bidgee Buzz was particularly interesting because it channelled the educational resources from all of the environmental agencies in the Griffith area towards a common purpose (which relates strongly to the inter-agency/ inter-program strategies mentioned below). This approach reinforces the philosophies of integrated catchment management within bio-regional areas as well as presenting opportunities for the different environmental agencies, organisations and stakeholders to promote their individual catchment management perspectives. The challenge in the future is to focus on coordinating all of these perspectives and presenting them in a way that is sequenced, cohesive and easy for the target audience to understand.

### Inter-agency/ Inter-program Involvement- Selling the program in smarter ways

As part of looking at strategies to provide as much grass roots support to groups as possible Streamwatch in the Riverina is now looking to other environmental programs and organisations to help support, integrate and distribute the event based education programs run through Streamwatch. For example, during the last Spring Water Bug Survey that was held within National Water Week, Streamwatch relied heavily on localised support from the Landcare Coordinators throughout the Murray and Murrumbidgee Catchments. The Landcare Coordinators were brought together and trained, using a Train the Trainer approach, prior to the event in the basic concepts of how to run a Water Bug Survey Field Day. In addition a support booklet documenting the concepts used and the basic strategies that could be employed during a day was produced for each of the Landcare Groups. This strategy presented a number of benefits in that the Landcare program was promoted widely, whilst peer tutoring and greater levels of community and school involvement were promoted. Above all significantly higher numbers of people were involved than would have been logistically possible if the survey had relied solely on the support provided by the regional Streamwatch Coordinators.

Using programs and networks that are already available, such as Landcare, Salt Action, Scouting and Outdoor Education organisations, Field Studies Centres, local environmental trusts, Rivercare, Agro-forestry networks, is an approach that logically benefits all parties. Not only is Streamwatch and environmental education promoted but the sister organisation is able to emphasis their environmental role, contribute their skills to the program and, hopefully, be a part of making a difference to the local environment.

Inter-program and inter-agency involvement in environmental education embraces the philosophy of integrated catchment management and this, as a matter of course, seems to be a natural direction for the future of all environmental education programs in the Riverina. Despite this it is important to note that the role of the Streamwatch Coordinator must become, and remain dynamic so that the entrepreneurial type ability to identify and support these local networks is maintained. Similarly it is important for the program to recognise the huge potential of these organisations and to develop support mechanisms to encourage future involvement.

## CONCLUSION

There is no doubt that environmental education programs such as Streamwatch are under constant pressure from all angles- whether this be financial pressure, pressure to keep evolving and adapting to remain in political and managerial favour or pressure from the community to remain as relevant as possible to their needs. There is no easy answer to these pressures but based on current and past performance the programs that Streamwatch and

Waterwatch have developed and implemented have established an excellent base for the development of dynamic and innovative products and the future looks very exciting.

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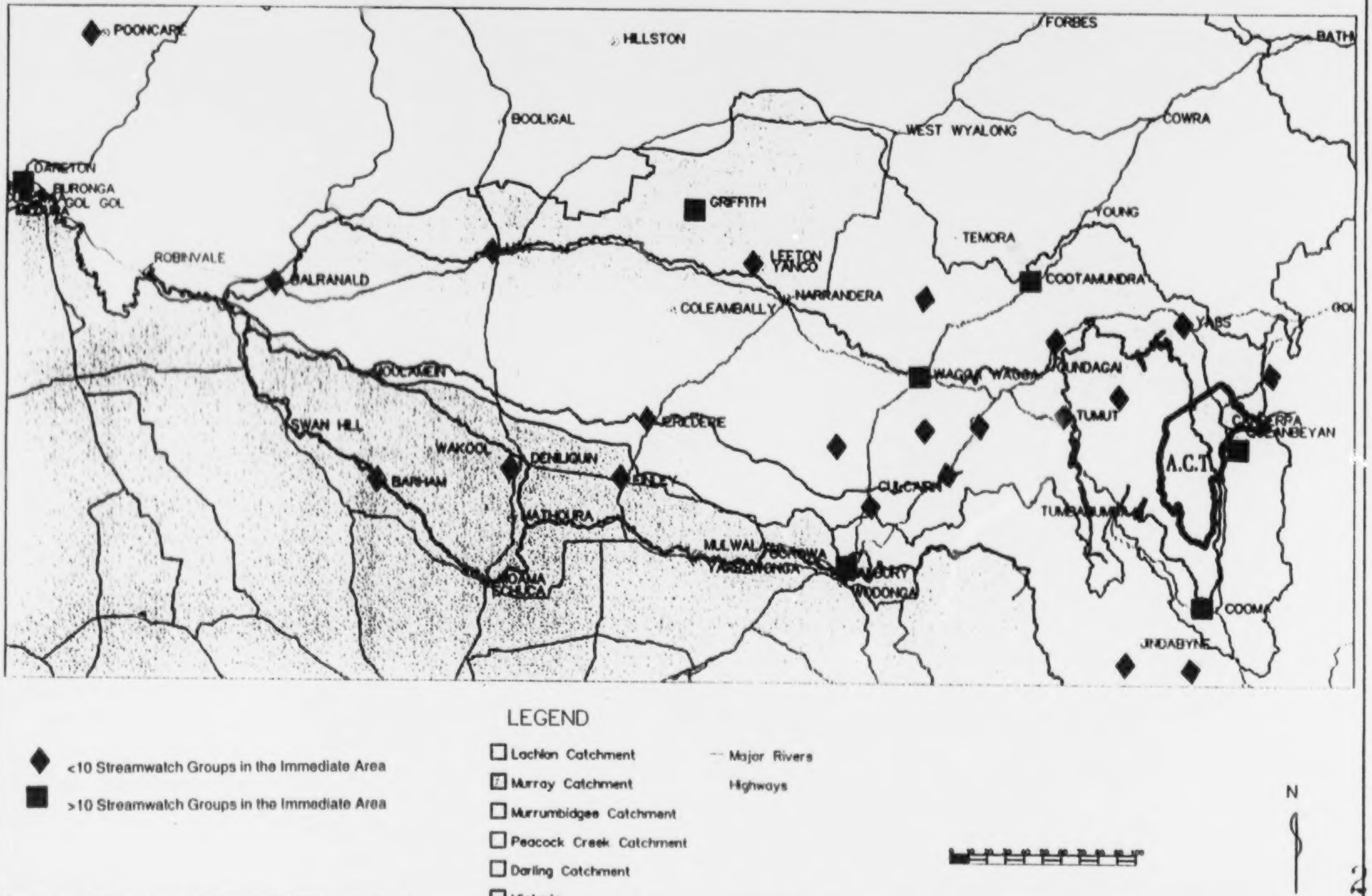
# STREAMWATCH IN THE RIVERINA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Prepared by the Department of Land and Water Conservation, LEETON – November 1998.

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# How Does Media Influence Environmental Issues?

Karyn.L. Paluzzano
Lecturer, Human Society and its Environment
University of Western Sydney, Nepean

## SUMMARY

This paper will investigate and address the question *How does media influence environmental issues?* The author is a primary school educator, who has an interest in environmental education and studies of society and its environment. Currently she is lecturing in an undergraduate teaching program. This paper has been developed from the need for teachers to examine environmental issues and research environmental themes before they plan classroom learning experiences for their students.

This paper should foster in the participants an awareness and a greater understanding of:

- what is media;
- media and its impact on environmental issues;
- values and attitudes within environmental media coverage; and
- media and environmental organisations.

## INTRODUCTION

This paper was written to raise awareness of teachers, to the use and functions of media and the media's influence on environmental issues. Media awareness for inclusion in teaching units is becoming a popular theme or topic. The title of the paper can be found in the New South Wales consultation draft primary syllabus Human Society and its Environment (HSIE). It is a suggested contributing question which helps to explore and research the question, "How should we interact with the environment?" In New South Wales teachers within the primary school have to plan their teaching experiences from six key learning areas (KLAs) - English, Mathematics, Science & Technology , Human Society and its Environment, Personal Development, Health and Physical Education and Creative Arts. Infused within these KLA's are the many mandated curriculum perspective documents. The document that has most relevance to this paper is the New South Wales Environmental Education Curriculum Statement (1989). This perspective document was written for application in the primary and secondary schools, thus it is a Kindergarten to Year 12 perspective. Teachers within New South Wales, when planning teaching activities have to refer to all KLA syllabus and curriculum perspective documents.

### What is Media ?

Without even realising it, most us take for granted the ever increasing availability of information infiltrating every aspect of our lives. We are bombarded by outside influences through such mediums as television, radio, magazines, newspapers, journals, movies and most recently the

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internet and the revolutionary cyberspace. Mass medium is a print or broadcast outlet through which material is communicated to the public at large (Duncan, 1993). The plural of mass medium is mass media, a term which encompasses all genres of technological communication. Likewise, the term mass media is synonymous with the term mass communication.

To communicate is to impart or transmit such things as feelings, news, discovery, knowledge, or to convey information or evoke understanding or make known (Duncan, 1993). Every human society, so called primitive or modern, depends on communication to enable its members to live together, to maintain and modify working arrangements about the social order and social regulation and to cope with the environment (Cunningham & Turner, 1993).

As outlined in Wright (1986), in regards to mass communication, there are four major communication operations at work. The first is the surveillance of the environment which refers to the collection and distribution of information concerning events in the environment, both within a society and outside it.

The second operation as outlined by Wright is the correlation of the parts of society in responding to the environment. The correlation includes interpretation of the information to be presented about the environment, prescriptions about what to do about it, and attempts to influence such interpretations, attitudes and conduct. These operations are usually exposed to the public in terms of editorial activity, propaganda or attempts at persuasion.

The third communication operation, the transmission of the social heritage, focuses on the assimilation of people into society. It concerns the communicative processes by which society's store of values, social norms, knowledge, and other cultural components is made known to and instilled in members and potential members. A non technical term that could be applied to this concept is socialisation, or societal education.

The fourth and final operation is entertainment which refers to communication activity primarily considered as amusement, irrespective of any other features they may seem to have. For example a television situation comedy could be regarded as an entertainment activity, even though it may contain some information.

As outlined by Wright (1986) mass communication is directed towards a relatively large, heterogeneous target audience, respectively known as the mass audience. As detailed in Cunningham and Turner (1993), to be considered a "mass" audience, is considered to be composed of too many people for the communicator to interact with personally during a reasonable period of time. It involves audiences whose members occupy a variety of positions within a society; persons from different walks of life, different generations and various geographic spots. The last criterion for a mass audience is the aspect of relative anonymity in that particular individuals in the audience are personally unknown to the communicator.

The media has a responsibility to inform the audience of issues in an unbiased manner. This however, is often not the case. Upon examination of aspects of the media, it is clear that if there is an issue that needs publicising, the media will play a crucial role. It has the resources and capabilities to access any audience in any walk of life and manipulate the material in whichever way is necessary in order to effectively attain the desired outcome.

## Media and its Influence on Environmental Issues

Hansen (1993, p.7) outlines three main effects of the media on environmental issues:

- it commands attention,
- legitimises action, and
- invokes action.

The media maybe hoping to draw attention to issues which might otherwise be ignored. They may be offering alternative interpretations on particular situations, and they will be attempting to establish a profile and an image for the organisation they represent. All these activities are worthwhile and essential parts of most campaigns, with a key rationale for the last goal being that of financial support.

Hansen states that the very act of achieving media coverage can result in establishing credibility for the environmental organisation concerned. If an environmental group's research is taken as credible by a journalist and is actively compared with that produced by government or industry, then this tends to legitimise the environmental group's findings. The media is able to push an issue to the extent that it demands attention, therefore increasing support for the cause. However at the same time, it is powerful enough to delegitimise and destroy an issue as quickly as it builds up and creates one. The important factor when examining issues is researching where funding is coming from, as this will determine which scope or argument will be brought out by the media. The name of the game is publicity and money, a goal which will be achieved at any cost.

The media also plays a key role in evoking action. The selection of appropriate arenas and tactics must be made on the basis of a sensitive understanding of the benefits and drawbacks of the various possibilities. The targeted audience plays a vital role in determining tactics since the key is support and funding. The media will target those who will be most affected by the cause and provide the influx of money.

Research into how people gain their information about the environment has found that 85.6% of the Australian population over the age of fifteen gain their information about the environment from the popular media (Australian Bureau of Statistics, May 1992, as cited in Castles, 1992). See Table 1.

| Environment Information Source | Percentage of people influences (%) |
|---|---|
| Media, newspaper of television | 85.6 |
| Government or local council | 41.2 |
| Library | 6.6 |
| School | 15.2 |
| Environmental interest group | 16.2 |
| From other sources | 5.0 |
| None | 10.1 |

Table 1. Information and its influence

Environmental disasters usually receive much media attention as a direct result of the visuality, or excellent pictures they provide. Immediate public outrage and action can be commandeered by simply showing the world horrific pictures of environmental misfortunes. Such is the case with the 1989 disaster of the Exxon Valdez tanker running aground, spilling 11 million gallons of oil into Alaska's Prince William Sound, marking this incident as the largest oil spill ever to occur in the United States of America. Pictures from the oil spill were horrifying as images of oil slicked wildlife and ecosystems were aired, leaving a mental imprint of the vast significance of the devastating disaster. The clean up process was atrocious as the measures taken by Exxon Valdez oil company were insufficient and ineffective resulting in the impossibility of a total clean up. The general public was outraged and the result was a billion dollar lawsuit against the company. Without the media coverage, there is no way the public would have been aware of the huge impact of the oil spill and the incident would likely have resulted in a cover up by the company and a downplay on its seriousness.

The audience is often at the hands of what can be termed "green" misinformation or exaggeration. We can all imagine the scenario of a reporter hastily writing a story without the proper research needed to accurately report the environmental issue (O'Neill, 1996). Another media trend, dubbed "The Big Scare", is where exaggerations and distortion of environmental issues are accepted uncritically by the media, government departments and politicians. The results are resounding echoes of false information creating a stir of panic and controversy for no substantiated reason.

One example noted in O'Neill (1996) concerns the debate over the issue of the levels of toxicity in dioxins. One environmentalist told a national television audience that "dioxins would cause an epidemic of death worse than cancer" in an effort to promote and publicise her environmental cause. Tragically, when a chemical explosion in northern Italy produced a cloud which caused local people to suffer nausea, headaches, diarrhoea and skin irritation, 90 women voluntarily aborted their foetuses after being told the cloud contained dioxins. A later study found no correlation between the contaminated area and foetal malfunction. However, despite these new results, environmental organisations such as Greenpeace, still canvas the dangers of dioxins and links to cancer, while the precise nature of the risks to human health posed by dioxins remain unsolved.

Carmody (1996) states that one kind of story that frequently skews the public's understanding of risk is the reporting of individual scientific studies, especially about health risks or cures. The string of controversial reports are often based on unfinished studies or on studies which have counterparts which derive opposite results. The result is confusion with frustrating reports on such issues as cholesterol, caffeine, or red wine (Carmody, 1996, p.45). The problem is that science is a process, and each study on a subject is a part of a movement towards a consensus. Also, because science is sometimes for sale to the highest bidder, any individual study should be suspect, reinforcing the concept that the financial sources and background of the reporters should be known or investigated.

### Values and Attitudes within Environmental media coverage

Environmental issues are perceived by the population by the way the information is presented to them. The media has the power to persuade and influence a societies' values or a person's attitude.

Observation of the subtle shifts in the societies' attitudes and values can be seen when reflecting on the past decade in Australia's green history. A small group of people began a campaign to save the Franklin River. That small group were joined by fellow kindred spirits and were maligned in the media as "Greenies". This group subsequently evolved into the Wilderness Society.

The action that was taken in the saving of the Franklin River remained a media focus and the media continued to influence the attitude of people within Australia. These attitudes influence of the final government decision to not dam the Franklin. The change of attitude can be expressed by a poster from the period which stated "Wild Rivers Saved".

Wescombe debates (as cited in Thompson, 1984 ) never before had a single wilderness preservation campaign attained global stature. But the 'movement of time' obscured (and continues to obscure) the fact that the Franklin was an issue with an historical context, that it was simply the most dramatic instance in an unbroken series of environmental issues that honed an increasingly sophisticated debate. It is this ideological and tactical sophistication that merits the international attention that has been focused on the Tasmanian Green movement.

An example of the use of positive media coverage to help change an audience's attitudes and values can be seen in a quote from a TIME magazine article (cited in Thompson, 1984, p.125). "There is not a soul upon the planet who cannot respond to the wilderness of the Franklin, the thunder of its cascades, the grandeur of its gorges, the peace of the morning mists in its lowland valleys". The imagery is so strong that it appeals to the emotion of the people and allows them to envisage the Franklin even if they had never experienced the Franklin personally.

Change in values and attitudes is evidenced by the change in government environmental policy. The Australian Government's environmental policy has historically been linked to the economics of the environment. An example of past government economic policy was the logging of a now rare species of cedar on the north coast of New South Wales. The logging of the cedar trees was an economic necessity of the 19th Century and had little or no regard to the preservation of the cedar trees as part of the Australian biodiversity. In recent times the society has seen a subtle shift in the attitude of government towards the environment. From the one of economic, to one of preservation for survival or what could termed economic sustainability. "Conservation is about the concept of the human race and that it must reduce its demands on the environment for the sake of other species. The main message that is being sent is we should look after nature as nature looks after us (Birch, 1993, pp.40-42).

The beginning of the subtle shift in government policy may have occurred as society shifted in its attitude towards recycling. In an article "Recycling Garbage" published in the Bulletin (14 March, 1989, cited in Hutchinson et al. 1992, p.327) it was stated:

"There's great enthusiasm for recycling among thinking people. It's a way individuals can do something about a global problem. It gives them a sense of involvement".

This attitude is influenced through the media and is a representation of the success of the promotion of local recycling projects. Papadakis another researcher in the field of environment and politics has expressed the opinion:

> "Environmentalists have become highly skilled in gaining publicity. The media in turn has profited from public interest in the environment. It has devoted more column space than ever before to issues like economic growth versus environmental protection. The temptation to exploit this potential conflict has remained irresistible both for the media and for competing interest groups (1993, p.72) ".

### The Media and Environmental Organisations

The degree to which environmental groups gain access to the media and to government hinges to a large extent upon resources, whether they be income, organisational factors, skills or knowledge (Hansen, 1993). Credibility is also a crucial factor governing media-environmental organisations. If environmental groups are to attract favourable media coverage, they must be viewed as legitimate and authoritative. For example,

> What makes [environmental organisations] so unique is that the organisation combines a strong research commitment with its attention-getting tactics ... independent of the publicity it generated the [environmental organisation] had to show that the issues had been seriously thought through and that viable intelligent options to prevailing policies were available (Hansen, 1993, p.55).

Greenpeace is a controversial environmental organisation as it relies on drastic actions in a bid to campaign against toxins, nuclear, atmosphere and biodiversity issues. Most of its protests are geared towards the visual content of newspapers and television; the performance of attention grabbing acts such as chaining themselves to trees to stop logging, blocking ships carrying supposedly dangerous materials to be deposited in the oceans and generally disrupting progress wherever there is a cause they feel is important. The organisation is often viewed as a nuisance by the general public as their antics are not always the wisest nor well thought through. For instance, they have taken to spiking trees that are to be logged so when the loggers arrive, the spikes infiltrate their cutting equipment with a potential to do bodily harm to loggers. Some feel they are often loud, outspoken, aggressive and frequently uninformed about the full context of environmental issues.

In contrast is the British environmental organisation known as Friends of the Earth (Hansen, 1993). They research all the issues they feel are important and are viewed by the media as a reliable resource on environmental issues. Their credibility is high as they are very professional in their bid to fight environmental wrongdoing. Their presentation of material and protests is much more subdued and less aggressive than Greenpeace and they manage to target a more well read audience who are concerned but do not feel the need to put their own lives in danger to save the environment.

## Conclusion

People have contact with media in one form or another and as such they are influenced to take a stand and act either individually or as a community. The media has both a positive and a negative influence on the environment but on the whole, awareness is the key to developing an informed public. The public must be aware, and must be able to exert pressure so that action will be taken by government groups and private organisations. The action of the globe will rely on its human population being informed about environmental issues.

Media should report on environmental harms and should tell us about progress being made in the environmental struggle. Environmental news must find a regular and prominent place in the flow of the world's news. Presentation of environmental news should hopefully avoid the inequity that has characterised the general flow of news at a global level. The media has a responsibility to provide accurate reports of findings and involve action when it is necessary.

The media has an immense influence on the environment and the attitudes towards it as illustrated by Lowe (1995, p.8):

"We have a love - hate relationship with the mass media. Despite the fact that we use them everyday, that they dominate our consumption of information and culture, that they impinge on just about every aspect of how we live and how we relate to each other, we still harbour feelings of suspicion and distrust about their role in our lives. This is the dilemma of modern society: we depend on the medias fundamental tools of our civilisation yet we fear their influence and their pervasive presence in our world."

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# CoastWalk, a Case Study of Environmental Education In the Community

Jocelyn Phillips B App S. M Env Ed.
Education/Communications Officer, Environment Tasmania
GPO Box 1396P, Hobart TAS 7001
Ph - (03) 6233 6098 Fax - (03) 6233 3800 Email - jocelynp@delm.tas.gov.au

## SUMMARY

This paper is based on part of the findings of a Masters thesis on CoastWalk, titled *CoastWalk, a Case Study of Environmental Education In the Community*. The thesis had three major aims:

1. To determine the effectiveness of CoastWalk as an environmental education process for social change:

2. To critique CoastWalk as a case study, so that others organising the next CoastWalk, or a similar event, can learn from past problems and successes.

3. To provide details on local coastal management issues discussed with CoastWalk between Melbourne and Sydney.

The main findings from the first aim of the thesis, will be discussed in this paper, i.e the effectiveness of CoastWalk as environmental education process for social change.

## What was CoastWalk ?

CoastWalk was a 4 month walk along the coastline of Victoria and NSW, from St Kilda Pier in Melbourne to Bondi Beach in Sydney. Walkers left Melbourne on the 12th November 1993 and arrived in Sydney on the 13th March 1994 aiming to raise awareness of coastal issues to the wider community.

The idea for CoastWalk came from a member of the community who had been involved in another coastal walk from Tweed Heads to Sydney during the summer of 1989-90. The idea of using a coastal walk to raise awareness, was taken to the coastal campaign section of the Australian Conservation Foundation (ACF) in March 1993. It was suggested to the co-ordinator of that campaign that it might be a good idea to focus ACF's campaigning on coastal protection at the community level in addition to the national level that ACF had been focusing its activities.

ACF's decision to support the walk was for several major reasons including:

- to gain credibility by learning first hand about coastal issues and then developing an action plan to deal with those issues post CoastWalk
- highlight the issue of coastal management
- use CoastWalk to place public scrutiny on RAC Coastal Zone Inquiry 1993

However, the support that was crucial to the success of the walk came from local community groups along the route of the walk, who provided active involvement and infrastructural support. Their support included the provision of meals, boats for crossing rivers and estuaries, accommodation and shelter, local knowledge about beach access and water availability, the organisation of information nights and media contacts, and publicity for CoastWalk.

### CoastWalk Facts

There were 26 locally assisted river/estuary/lake crossings. Accommodation included camp grounds, caravan parks, bush camping, community halls, private backyards and houses, surf clubs, army reserve barracks, church camps, fishing clubs and schools.

The distance CoastWalk covered was approximately 1500 km over a period of 122 days or 4 calendar months. The walking followed the coastline as much as possible.

On average there were 10 CoastWalkers each day and 2-3 support persons each day. The minimum number of CoastWalkers on one day, was one, and the maximum number was 60. The number of people who joined CoastWalk between Melbourne and Sydney was approximately 550. Five of the 10 walkers who started in St Kilda, travelled the whole distance to Bondi.

The sponsors for the walk were Channel 9, Paddy Pallin, The Australian Army, Telecom Australia, St Kilda City Council, and Coulton Farms.

Media, and Public Information Nights, and contact with the public during walking were the major methods for taking the CoastWalk message into the public domain. CoastWalk had a media officer who liaised with local and national media, provided media kits to local newspapers and organised photographers. A newsletter 'CoastTalk' was also produced.

## Research approach and design

Grounded theory, a qualitative methodology, was preferred over a quantitative methodology, for this study, because it allowed methodologies to emerge as the study topic unfolded and therefore be closely suited to the topic and scope of the study (Lincoln and Guba 1985).

Methodologies that did emerge, were primarily qualitative, that is, interviews (in person and by questionnaire), and participant observation (noted in a daily journal).

The emphasis of the research focused on measuring the effect of CoastWalk in relation to evidence of change in both the individual and/or the wider community, at the level of:

1. Awareness raising,
2. Understanding of local and national coastal management issues, and/or
3. Direct actions, undertaken in relation to those issues.

The three groups chosen to evaluate the effects of CoastWalk were:

1. The General Public in coastal towns,
2. The Local Community Groups (LCG), existing community/conservation groups along the route of the walk,
3. The Walkers: Visitor Walkers (those participating for a few days, weeks or months), and the Core Walkers (those participating all the way from Melbourne to Sydney).

During the research on CoastWalk, information on the effect of CoastWalk on these groups was gathered from a range of sources, including:

- Interviewing members of all three groups,
- Information Nights,
- CoastTalks (the CoastWalk newsletter),
- Telephone register (an ACF hotline for the general public to register their support with), and
- Personal journal.

## Research findings and conclusions

### *Short Term Awareness in General Public*

The data for the General Public, who largely did not participate in CoastWalk, suggests that the major influence from CoastWalk was an increase in awareness in themselves and others about the need to have concern for coastal management issues, see Table 1. From this data, it can be inferred that ACF's aim to highlight coastal management issues in the wider community, was achieved.

**Table 1 General Public who observed or experienced change due to the influence of CoastWalk (n=52)**

| Type of change | Change experienced in self | | Change observed in community | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Awareness | 16 | 31 | 26 | 50 |
| Understanding | 2 | 4 | 0 | 0 |
| Action | 1 | 2 | 0 | 0 |
| Total | 19 | 37 | 26 | 50 |

| | |
|---|---|
| Awareness | General awareness that coastal issues exist |
| Understanding | Understanding of specific details of coastal issues, i.e. the destruction of seagrass as marine habitat destruction |
| Action | Actions towards the environment such as more coastal walking, joining an environment group, buying a reference book on coastal wildlife |

It may be said that this awareness was achieved through CoastWalk's media and publicity activity within the mass media channels of local newspapers, radio stations and occasional local television broadcasts. This is because members of the interview groups of LCG's and Walkers observed a connection between mass media and publicity activities for CoastWalk, and the raising of awareness in the wider community, as illustrated by the following comments:

'There is an impact, through publicity there was awareness of the Walk.'(LCG12)

'The publicity in the papers made me aware of the impact [of CoastWalk].'(V1)

The questions then need to be asked as to whether this perceived and/or personally experienced change in awareness translated into either:

1. Change in values and actions, and/or
2. Long term change.

It would appear that for the great majority of the General Public members interviewed, their improved awareness did not translate into any further direct action or change in behaviour towards or values about their coastal environment. Examples of comment by LCG's and Walkers reflecting this situation are as follows:

'CoastWalk achieved local awareness at the time - this awareness has not been ongoing.' (V3)

'[CoastWalk's effect was] very much on the surface, we agreed it didn't achieve much.' (LCG5)

The short term nature of the Walk's impact in the wider community is not surprising, considering that short term 'events' are the main information sources used by journalists. This journalistic practice gives control to the origin of information, the events or issues, absolving the journalist of the need to focus on the 'big picture' (Anderson 1993).

### *Long term change in Walkers*

However, writers such as Wiebe (1971) and Stearn (1988) cast doubt on the media's power to provoke significant or longer term lifestyle changes without the help of agencies. When using media alone for environmental education purposes, Wiebe (1971) points out there is a danger of creating a well informed public who are then left in a state of futility. Stearn (1988: 20) also indicates that mass education falls short of what is needed to change peoples habits, for example viewing a program does not get a car retuned to run on unleaded petrol.

Table 2, shows that affirmative change in Walkers was not only at a high percentage but was more than or equal to the change as observed by them in the wider community.

**Table 2 The influence of CoastWalk on Walkers (n=12)**

| Change in | Affirmative Change | | | | | |
|---|---|---|---|---|---|---|
| | Y | | N | | NK | |
| | No. | % | No. | % | No. | % |
| Individual Walkers | 10 | 83 | 2 | 17 | 0 | 0 |
| Wider community | 9 | 75 | 2 | 17 | 1 | 8 |

| | |
|---|---|
| Y | Yes |
| N | No |
| NK | Not known or not sure |

In terms of the change experienced for seven of the 11 Walkers, the change represented a further improvement in their understanding of coastal management issues, as characterised by the following comment:

> 'CoastWalk had an influence on me by showing me how people's actions can effect the coast. It has made me more determined to increase people's awareness of environmental issues and in myself to be more consistent in the way I treat the environment.' (V6)

For the remaining four of the 11 Walkers, the change was a reinforcement or improvement in not just one but all three categories of change, i.e. awareness, understanding and action. This is illustrated by the following comments:

> 'I was already very much motivated towards the preservation of the coast. The dedication of the Core Walkers to their cause helped my resolve to keep working to this aim.' (V2)

> 'I know that there are people interested in our coastline and groups I can approach. I look carefully at the birdlife and I've bought a book on birds and one on shellfish and I try to identify what I see. I have always walked two to three days a week, but now my observation powers have increased and I venture further afield. A few friends and I are now walking together as a small group when time permits.' (V4)

When viewing the overall 'pitch' of comments by Walkers, LCG's and General Public, the Walkers seemed to be influenced on a much deeper and more profound level. The longer a Walker was involved, it appears the deeper influence that CoastWalk had on their lives, i.e. Walkers who participated for a few weeks or months experienced a deeper and personal level of change than those who walked with CoastWalk for one day to one week. The following quotes illustrate change in Walkers who participated in CoastWalk for one day:

> '[CoastWalk] made me more aware of the need to keep our coast open to the public. It achieved publicity for ACF and awareness for the local people as to the worth of their particular part of the coast. It made me more aware of weed and land owner problems.' (V1)

> 'I was aware of a number of concerns regarding the coast, CoastWalk confirmed many of the concerns.' (V3)

Compare the above changes with the following excerpts from interviews from Walkers who participated in CoastWalk for more than one week:

> 'We had fish and chips on the beach for dinner one night and I was going to throw the paper in the bushes like I usually do, but instead I put it in the bus to take home. It didn't take much, I can't understand why more people don't take the initiative. My commitment to the environment is in small ways now, doing what I can in my own backyard. Setting an example to others is the best way of teaching.' (V20)

> 'You can read extensively on a subject but for me to be out here and make a physical connection, it's different. I learnt a lot about the coast directly, what Dunecare is about and how individuals are out there doing things. I now have an appreciation that things do need to happen such as user pays in National Parks to fund management problems. I was going to set up my own business anyway, but now I can do it with a personal understanding of why we need to create less waste and pollution and manage the environment better. I am also aware of the need not to do things to make a buck, but to enhance our future lives.' (C1)

The above quote also illustrates the difference between knowledge gained from reading material (intellectual knowledge) and knowledge gained from experiential learning. This individual had gained intellectual knowledge from reading literature, however, it was his participation in CoastWalk which empowered and motivated him, to extend his knowledge gained experientially into other areas of his life such as the underlying philosophy for his business.

These quotes also describe a connection or link with the environment that has influenced the actions of the people concerned. These links to the earth or (to observe the title theme of this conference) EARTHLINKS, were facilitated by the individual people walking along the coastline for some time, experiencing the environment first hand.

The thesis concluded that Walks aiming to highlight environmental issues, such as CoastWalk which provide opportunities for community participation, are important and can bring about awareness and change in individuals and the wider community. How one defines a Walk's success or problems is very much a subjective judgement, and may be dictated to by one's collective experience and perspective of the world. Even if only one individual in one million were reached through such an event, is this not of value ?

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# TOWARDS THE HOLISTIC TEACHER IN ENVIRONMENTAL EDUCATION

**ILGA SALITE Daugavpils Pedagogical University, LATVIA**

## SUMMARY

For EE it is necessary to have a holistically thinking teacher. Holistic teacher is characterized by: 1) his or her individual values, the understanding of all interconnectedness, authenticity, which is revealed in his or her wisdom, 2) the ability to attain success trying to reach EE aim in his or her professional work.

It is shown putting focus on ecocentric attitude characteristic for Latvian life wisdom and the development of EE during the last 20-30 years in Latvia that this development has given the result - holistic approach to EE which at the same time is not only the result but some kind of returning to the things essential to Latvian life wisdom too. The results of the research reveal that professional views about EE and cultural attitudes are not connected.

The experience collected in DPU can be characterised as striving to find the possibility through the research of individual values and with the help of ecosophy to get awareness about the of ecocentrical attitude and to emphasize the resemblance of it with the Latvian life wisdom so making the transition to holistic understanding of EE easier and more natural.

## INTRODUCTION

Holism emerging in the environmental education made the question about holistic teacher urgent through out of the world.

I have arrived at the holistic approach through my studies of pedagogy, psychology and philosophy with an emphasis on EE. At the beginning concepts of human, culture, ecological problems were approached in close connection with holistic ecology ( Salite, I. 1993, 1994 ). This viewpoint gave the opportunity to face the concepts of ecological values, ecological identity, ecological Self, authentity.

A deeper look at the core of these notions helped me to investigate the approach of holistic ecology and formulate the aim of environmental education as to restore man's deepest various connections with the world by changing present egoistic and anthropocentric aims, purposes characterizing a modern man, to overcome a narrow tehnocratic consuming attitude to the environment.

On these premises aim of EE seems to be clear and understandable though it should be recognized that the realization of this aim in contemporary educational practice is not easy. Especially, realization of principles of holistic education involves the shift of the thinking stereotypes of educators. However, problem of change of old stereotypes is not the only one. Difficulties arise also from the peculiarities of holistic paradigm and holistic education. One can understand holistic approach very differently. R. Miller ( 1993) wrote "that holistic paradigm emerged as a vibrant and coherent intellectual movement in the 1980s but holistic thinking is not new. It has deep roots in ancient spiritual traditions and cosmologies which Aldous Huxley described as perennial philosophy". He wrote that holistic education can be "percepted as modern philosophy in different organized and unorganized forms, class activities and approaches" ( Miller, R. 1981). The essence of holistic education is wholeness: "Because there are many synonyms for wholeness, there are many ways to characterize this perspective : holistic, ecological, evolutionary, spiritual, integrative, global " ( Clark, E. 1991).There is a view that holistic education seems like unifying movement in modern education with orientation toward the search for wholeness. We can find the suggestions for theoretical understanding and practical research of these topics in works of many holistic theorists. I would like to mention K. Kesson, J.Miller, R.Miller, J.B.Callicot, L.Stoddart, C.L.Flake, B.Campbell, Ph. Gang, D. W. Brown, Ed. T. Clark, Jr. etc.

From theory above it follows that selection of modern approach should be based on three statements:

* nations primeval views about connections with Earth;
* results from contemporary educational researches which reveal current human attitude toward the world and his or her ecological identity as a result of previous education;
* teachers skills to use holistic approach in his or her professional activity.

## HISTORICAL OVERVIEW OF TENDENCIES IN THE DEVELOPMENT OF EE IN LATVIA

Situation and problems in Latvia EE shows the:

* primeval beginnings with the development of Latvian life wisdom;
* experience of last 20 -30 years when EE was viewed as actual;
* urgent necessity to solve the problem about the general pedagogical education of teachers for work in EE.

Awareness of Human / Nature relationships is rooted in traditional ethnical consciousness, maintaining and further development of these notions in folklore, Latvian literature and Latvian pedagogical view. In short about some historical causes which had an impact on Latvian thinking:

1) since the ancient times Latvian relationships with the inhabited territory fostered raising of view about Human / Nature interactions. Nature is foundation of the development of Human consciousness - Human being comes from Nature and his development occurs through Nature. This view became the foundation for pantheism, awareness of ethnical roots and identity;

2) pantheism allowed to understand the God as Nature and Nature as God. In the Latvian thinking God is the highest advice who will come;

3) world view is connected with the foundation of Latvian character. In this character there was a tendency towards the priority of individual values, desire to decide and act on his own prevails. There is a conviction that one should be evaluated on the basis of what he prefers, towards what his essence strives. The basis of this approach is not rationality, it is feelings and fantasy which dominate over reason. That is why Latvians always had believed that light will overcome darkness, good will overcome evil;

4) in time most typical values crystallized such as the highest: white colour, work, peace, silence, mercy, obstinacy, spareness.

Oral folklore took care for the keeping up of this traditional world view, later this was developed in Latvian poetry and literature.

In national romantic poetry bright fantastic images were kept as well as real life was portrayed which called reader to the development of mind and reflections, to give up oneself, to have ideals for the benefit of Nation ( Zeiferts, 1993 ).

Latvian pedagogical thinking began its development from traditional ethnical outlook and environmental education was one of the first which dominated. First Latvian educators A.Kronvalds, Auseklis, A.Spagis wieved nature studies as the most important and especially focused their view on aesthetic aspects of this education through songs and poetry.

To summarize Latvian traditional understanding about Man / Nature relationships we should say that it is holistic and spiritual. This understanding formed in deep aesthetical, ethnical, spiritual ( religious firstly afterwards based on highest human values ) harmony with environment which still is the basis of Latvian identity. Latvian pedagogy from the very start was oriented to the goal of promoting the development of higher levels of authenticity.

40th interrupted the development of Latvian pedagogics, changed the circumstances of Latvian world outlook creation as the Soviet occupation brought new ideology and philosophy. Looking back on the history of EE after this interruption we can say that Latvian pedagogical high - school already have 20 -30 years long experience in teacher training of EE. In previous years this education was called "nature protection education", "ecological education", "ecological education and upbringing", 'environmental education".

In the essence these differently named experiences are united process in the direction of harmonising the relationships between Man and Nature. Courses and content of these courses introduced in the pedagogical high schools since the late sixties are prove of changes in attitude toward ecological problems and the solutions of these problems. Since the beginning lack of knowledge was considered as the couse of ecological problems, that is why the way toward deeper knowledge was taken to create the patterns of adequate behaviour. As the incompleteness of ecological knowledge was viewed as the cause of ecological problems nature protection and ecology course were introduced, nature subjects programmes were developed in pedagogical higher schools. Programmes were improved by reinforcing the practical activities in nature protection and regional study courses in field practice.At the same time with the improvement of curriculum for biological cycle subjects critique of monodisciplinary approach began. That was the period of so called subjects' ecologization when nature protection and ecological aspects were accentuated and considered in all other learning subjects.Despite the essential development and improvement of the high school curriculums EE still appears very actual and demands the solution. It became clear that it is time to consider the growing global problems without separation, in a wholeness showing the central, essential moments and the cause of these problems. It was the new vision in EE when ecological problem was looked upon in the connection with educational, cultural problems. It was change in the context which raised the assumption that real cause of ecological problem is not the lack of facts but thinking and attitudes. That was time when the conclusion that ecological problem as such is philosophical problem was heard more often.

On the basis of this conclusions at the end of 80$^{th}$ the group of enthusiasts in Daugavpils Pedagogical University started the course toward the studies of holistic EE problems. This investigation began with the thought that holistic environmental education is in the same time spiritual, integrative and ecosophical. These three features described the essential view of holism as the spiritual connection and unity of human with the world, Universe. This unity reveals itself as harmony of human inner values with the basic processes in Universe, his or her authenticity.

In the beginning of our work V.Vernadsky, K.Ciolkovsky, I.Kant, J.Rainis, J.Lovelock philosophical and ecosophical views were used as the theoretical background. Afterwards theoretical background was deepened with:

1) works of deep ecologists and their followers , which gave the opportunity to get better understanding of ecocentrism;

2) works of holistic education and EE theoretics especially from North America, Canada, Australia etc.

In the theoretical background of environmental education especially important is the question about the role and place of values in different philosophical and educational paradigms. With the development of holism it became evident that " values are derived from seeing and realizing the interconnectedness of reality " ( Miller, J.1993). With that the deep and manifold connection of the individual with the world, his or her values, ecological identity is the aim to be strived for in EE. And the way towards this aim depends on :

- teacher's own values and ecological identity;
- his or her professional skills to work on both levels of EE curriculum:

1) at the content level (concepts and the knowledge about the world ) ;
2) level of metacurriculum ( focusing on pupils learning skills and strategies based on their ecological values and constructs of action motivation).

If center of our efforts in teacher training is fostering of these professional abilities we should look for solution of three important tasks which prepare teacher for the work in EE and especially work at the metacurriculum level:

1) the possibility should be given to student - teachers to clarify authentic and ecological identity, their ecological values, to examine their connectedness with the Earth, which shows their authenticity;
2) to give a possibility to student teachers to acquire children's ecological values ( both individual and those of the group ), simultaneously getting acquainted with the qualitative research methods:
3) to give a possibility to students to acquire skills and knowledge in order to develop or sublimate children individual ecological values.

For the realization of these tasks at DPU we have started alternative course "Bases of ecosophical education" and master programme in pedagogics "EE in elementary school".

## COURSE "BASES OF ECOSOPHICAL EDUCATION"

Choise of title " ecosophical " was influenced by:

1) ecosophical ideas and deep ecology of A.Naess ( 1993) ;
2) basic motives of Latvian wisdom of life which are ecosophical in their essence.

Optional course "Bases of Ecosophical Education" has been introduced since 1993. The course is aimed at improvement of students professional education in the field of EE.

Course includes:

1) ecophilosophical, psychological, pedagogical etc. scientific interpretation of Man / Nature relationships of different attitudes toward Nature;
2) opportunity to find out and evaluate one's own attitude to world;
3) opportunity to prepare for practical activities with children where they study attitude toward Nature and world.

Valuable merit of the course - it helps students to discover peculiarities of ecocentrical attitude and get deeper awareness of the vital feature of spiritual upbringing - ecosophical attitude toward the world.

Ecosophical attitude is stable structure determining high level of integration between individual or group experience, knowledge, feelings and values.

Features of this kind of attitude were utilized as structure ( foundation ) in organization of students' creative work. We suggested to them to investigate and discuss the content and interrelationships of concepts "culture", ethnical values", ecological values", "colours" in context of ecosophical attitude .

In discussions students investigated content of these concepts, different approaches to interpretation of them, discovered their own positions. Afterwards their reflections were collected in essays. At the same time students made their own research projects in schools to find out pupils' understanding and attitude toward these concepts. Students collected real facts which helped them understand the problems under discussion better. These activities resulted in the first conclucions of future teachers summarized from discussions and researches.

This course is useful for training of holistical thinking of teachers because the essence of ecosophical education flows from teacher. He or she has to be with sensible heart if he or she wants teacher work to be the work for soul. This is the requirement of holistic education. From holistic perspective education is the process which helps to develop and maintain ecological identity individually diverse and changing with time in direction to the person's harmony with the world. This process results in ecological identity allowing the human to understand himself as one of the creations of natural evolution with the mission of spiritual creativity. This identity can be realized in the ongoing process of human self - fulfilment, self-completion where his selfawareness matures. These changes foster the person's openess toward the world survival capacities thus realizing his own ecological mission.

Holistic view of education shows that at individual level united aim and harmony with the world can be reached differently. This requires the respect to the diversity of students' individual relationships with the world and search for the diversity of pedagogical solutions in ecosophical education. The students get this conclusion in this course.

The deepening of these ideas continues in master programme in pedagogics "EE in elementary school ". For three years this programme provides looking deeply into methodological and philosophical, ecosophical, psychological, ecopedagogical questions of EE. The programme is realized for the third year and experience is insignificant for the time being, but the tendency that participants of the programme take up the research and estimation of esthetic and ethic levels is seen. In essence these are two important levels of authentic existence what is the base of the quality of man. The teachers who master this programme in their research works are mainly taking up the problems of psychological, moral, holistic congruence and are working on the practical solution of these problems. The investigation of these problems deeply influence the thinking of masters themselves. We have noticed that the participants of this programme offer creative and non - traditional works.

We based the introduction and development of this course on the results of research. We did it measuring of the attitude towards environmental education of teachers and students of the pedagogical university, the lecturers of the Latvian pedagogical higher schools. We shall mention just some results which prove the necessity to develop the general pedagogical preparation of teachers.

We investigated the attitude of the teachers and students of our pedagogical university towards various activities of environmental education by using a questionaire. We offered to choose the eight types of activities: 1) outdoor activities, 2) activities based on using ecological potential of native traditions and folklore, 3) activities with creative implementation of ecological knowledge, 4) activities with reproductive implementation of ecological knowledge, 5) lectures on scientific and popular scientific topics, 6) activities based on short and diverse factual information about state of environment, 7) discussions on environmental issues, 8) graphical work ( composition, newspapers).

First of all we asked respondents to select activities which are most effective in order to reach the aim of EE. In this way we identified the mastery goal orientation of the teachers and students. According to the results we can say, that : 1) teachers and university students tend to acknowledge outdoor activities ( 33% of the teachers respondents, 18% of the students respondents) to be the most effective in EE; 2) the mastery goal orientation of the teachers showed a tendency of teachers to be oriented towards the expanding and deepening of ecological knowledge ( 33% of the teachers respondents acknowledged the lectures on scientific and popular scientific topics ); 3) the tendency of both teachers and students recognize as an effective activities based on use of ecological potential of native traditions and folklore.

Secondly, we asked respondents to select activities which they would like to carry out most of all. This helped us to clarify perfomance goal orientation of teachers and students. By measuring perfomance goal orientation we find out that respondents have tendency to choose activities based on use of ecological potential of native traditions and folklore ( 34% teachers respondents and 21% students respondents), activities on creative implementation of ecological knowledge ( 18% students respondents and 6% teachers respondents ) as well as graphical work ( 22% teachers respondents and 17% students respondents).

Question raised if it is deep conviction of teachers and university students that activities based ecological potential of native traditions and folklore are universal tool in EE or it is intuitive or conscious compensation of lack of professional competence with culturaly traditional means.

Deeper studies of attitude were continued by the research of essays written by the teachers from Latvia's teacher training institutions, Latvia's school teachers and students from Daugavpils Pedagogical University ( Salite,I. 1994 b).They tried to define and comment their approach and attitude towards EE in these essays. The participants in the group suggested vast range of narrower and wider definitions. The conclusion was:

* the participants of discussions connected with teacher training tended to defined aim of EE with emphasis on the attitudes, ethics, self - actualization in the world,

* teachers approach mainly emphasizes the sum of knowledge, the total amount of undertakings, the formulation of the world view system,

* students approach to EE definition was influenced by the university courses studied by them. DPU Biology department first year students expressed the hope that knowledge of ecology and biology and practical activities in the field of environmental protection will help to overcome the ecological crisis. DPU Humanities department first year students who studied the course "Bases of ecosophical education" tried to get the insight into the deepest leyers of the relationship between Man and Nature, adhering to the ecosophical attitude of the Man towards the world, tried to explain its charectiristic features.

In this research where teachers interpretated EE from their professional point of view they did not refer to ethnical traditions and values.

No doubts that modern tendencies in EE shows orientation on ethnical values and ecological identity which are very strong in Latvian cultural heritage. In our case the gap between teachers professional experience and ethnical heritage was observed. To lessen this gap we gave opportunity for our students to study ecosophy and latest tendencies in EE which would help to discern these motives in native heritage.

With situational tests we analized coefficients of pedagogical university students' ecological consciousness which show the differences in attitude on evaluation of various situations. Coefficient of ecological consciouness ranges from - 1 to + 1. Following coefficients were identified: $K_1$ - respondents ecological consciouness assessing small range ecological activities of others, $K_2$ - respondents ecological consciousness prognosing one's own behavior in small range ecological activities, $K_3$ - respondents ecological consciouness assessing wide range ecological activities of others, $K_4$ - respondents ecological consciousness prognosing one's own behavior in range ecological activities.

Given results describe the differences in attitude:

K1 = -0,1 K2 = -0,4 K3 = 1,0 K4 = 0,2 ( 1992 )
K1 = 0,1 K2 = -0,1 K3 = 1,0 K4 = 0,8 ( 1994 )
K1 = 0,8 K2 = 0,2 K3 = 1,0 K4 = 0,8 ( 1996 )

**Differences in coefficients clearly demonstrate differences in motivation constructs of ecological activities which are closely connected with selfassessement and assessement of others. The results as well as results of related researches confirm the necessity to include the study of these questions in general education of next teachers with the aim to foster their ability to work on EE in contemporary situation.**

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# Environmental Education for Industry

**Helen Scott**
**Education Coordinator Southern Regions**
**NSW Environment Protection Authority**

## SUMMARY

The NSW Environment Protection Authority (EPA) is encouraging industry to implement Environmental Awareness training for all staff from management to the operators and to establish a system to ensure that the education is turned into action.

There are a number of reasons why some industries have embraced environmental education including:

* the knowledge of their responsibilities under the legislation,
* the potential costs of ignoring the defence of *all due diligence*,
* the understanding that Environmental Management Systems and ISO14000 will be important in the future, and,
* the recognition of the value of a good corporate image.

The South Coast region of the EPA has been involved in developing environmental education programs with industry in the region. This involvement has taken a number of different forms as has the resulting program.

This paper discusses the different methods both the EPA and industry have used in initiating, developing and implementing environmental education for staff. Two case studies are used to demonstrate the different ways in which the process has been initiated, the resulting content, structure and delivery of the courses. The region is also working to encourage industry to implement systems that ensure an ongoing commitment to environmental responsibility by all employees.

## INTRODUCTION

A study conducted by Management students at Shellharbour College of TAFE showed that although senior management in industry were environmentally aware, the rest of the staff, including the middle management and operators, were not. This conclusion was deduced from the results of a survey of industries in the region of the Illawarra conducted by the students. The survey asked industries about their knowledge of their environmental responsibilities under NSW legislation. (Management Group Shellharbour, 1994)

The study recommended that industries need to educate staff about their responsibilities. It also recommended that educational institutions that trained middle management and operators for industry include environmental education in their courses as well as providing industry with modules of training that could be adapted to individual sites and industry types.(Management Group Shellharbour, 1994)

The impetus for the study was anecdotal evidence that the majority of industries and management courses did not provide any training in environmental awareness or management.

## WHY EDUCATE INDUSTRY?

### *Due Diligence*

The NSW EPA implements a range of environmental legislation including the Environmental Penalties and Offences (EP&O) Act 1989. Under section 10 of the EP&O Act, Directors, Managers and responsible officers of corporations are personally liable for a breach of the environmental legislation by the corporation unless they can show that:

- *the corporation contravened the provision without the actual, imputed or constructive knowledge of the person; or*
- *the person was not in a position to influence the conduct of the corporation in relation to its contravention of the provision; or*
- *the person, if in such a position, used all due diligence to prevent the contravention by the corporation*

The interpretation of this Act in the Land and Environment Court has led to the understanding that a company has not demonstrated *all due diligence* if it has not adequately informed the employees of the company of their responsibilities in protecting the environment. Under the EO&P Act an individual who causes pollution either intentionally or negligently, and harms the environment can be fined as well as the director, manager or responsible person.

An education program about the environmental responsibilities of the employees as part of a comprehensive program to prevent pollution will contribute to the defence in court that the employer has shown *all due diligence*. Merely taking precautions that are usual for the industry does not necessarily amount to due diligence. (SPCC V KELLY 1991 5 ACSR 607)

The potential fines under the EO&P Act 1989 are large, up to one million dollars for corporations and up to $250,000 plus seven years goal for individuals, and companies are now recognising the cost/ benefit of demonstrating *all due diligence* by educating their staff about their responsibilities to protect the environment.

### Environmental Management Systems

A voluntary ISO series is being developed by International Standards Organisation to provide organisations worldwide with a common approach to environmental management in a similar fashion to the quality accreditation of companies. Two standards have been released as Australian standards, one called AS/NZS ISO14001:1996 - Environmental Management Systems -Specification and Guidance for Use, and AS/NZS ISO 14004:1996 - Environmental Management Systems - General Guidelines on Principles, Systems and Supporting Techniques.

The NSW EPA has been involved in designing the requirements that companies will need to meet for AS\NZS ISO14001 either for self declaration of an EMS or for certification/registration by a third party. It has also been actively encouraging companies to use EMS as a voluntary tool to improve environmental performance. Many companies are becoming aware that there will be increased pressure for accreditation in the future. Others who have international markets are already needing to prove that they have an EMS in place before their overseas customers will accept their products.

In order to attain accreditation under ISO14000 a company needs to demonstrate that it has an effective EMS in place. This entails an number of things including a system to ensure that the employees are cognisant of the environment policy and plan for the site as well as a system for ensuring ongoing involvement in monitoring the effectiveness of the plan. This requires an initial training program to introduce both the environmental policy and plan as well as setting up a system for staff to report back its effectiveness and suggest improvements.

### Corporate Image

Many corporations recognise that a good environmental performance improves their corporate image within the community. This has a flow on effect of reducing the number of complaints about pollution emanating from the site. This is particularly important for industries working in environmentally sensitive areas.

Educating staff about pollution control and reduction programs on the site will result in more information about these controls and programs reaching the broader community. In sensitive areas, training which will increase employees' environmental awareness can lead to a better understanding between the community who visit or live near the site because of the surrounding area's environmental beauty and sensitivity and those members of the community who are there for employment.

### Environment Protection

The most important outcome of environmental education of employees in industry is a greater protection of the environment. This could result from a change in the behaviour of the staff in their work practices that would reduce the impact of the industry on the environment or the prevention of pollution of the environment as a result of *due diligence*. Experience has shown that an increase in environmental concern often results in employees coming up with solutions to pollution with sometimes very simple technologies or just improved housekeeping on the site.

## ENVIRONMENTAL EDUCATION IN INDUSTRY

### Industry Initiated

A number of industries in NSW recognised the benefits of educating the staff about their environmental responsibilities and initiated training programs for the staff.

Probably the first of these was the Sydney Water Board, ( now Sydney Water Corporation) paid for by an environmental levy. The Environmental Care Training Team was set up as part of the Environmental Management Unit (EMU). It developed a training package for all staff. The package was designed to be conducted over a number of weeks with groups composed of personnel from all levels of the organisation and to be sensitive to the multicultural nature of the staff with different levels of English literacy and numeracy. This extensive method of educating the staff is only achievable in large organisations with sufficient funds designated to the program by a supportive management and owners or shareholders.

In the South Coast region of NSW a number of industries has initiated environmental education for staff by approaching local training institutions. The Port Kembla Coal Terminal (PKCT) engaged the Illawarra Technology Corporation (ITC) to develop and implement a course for all their staff. Marion Pearman was given this task and contacted the South Coast office of the NSW EPA to assist in the development of the course and participate in the training.(Curtis G., Scott H. & Pearman M., 1994) The course covered general environmental awareness, staff responsibilities under the environmental law and *due diligence* as well as site specific information about the environmental regulatory requirements within the licence.

Another industry in the region, Southern Copper Ltd, approached the local TAFE College to train their supervisors and operators in environmental awareness. TAFE offered some modules from the *Engineering Production Certificate* which are accredited under the National Training Agenda. The modules were *Air Pollution EPC124, Industrial Waste Management EPC66* and *Energy Management EPC64* and the course coordinator asked for the assistance of the local EPA office in adapting it to the needs of the specific industry and the particular site.

All of these courses have been conducted outside the work place and have used a class room learning technique with videos and group activity work. They have had no accompanying system put in place back in the workplace to provide the opportunity for feedback and ongoing environmental improvement.

### EPA initiated

The South Coast Region of the NSW EPA recognised the need to become proactive by encouraging industry to educate staff about environmental awareness and their legal responsibilities. An operations officer, Paul Wearne, identified two industries to target with environmental education. The first was a limestone mine in the Sydney Water Catchment and surrounded by Bungonia State Recreation Area, Case Study 1.

Having achieved a successful outcome in Case Study 1 Paul approached BHP Slab and Plate which now incorporated the sheet and coil division at Port Kembla. We were aware that BHP had a training video about the environmental duties and responsibilities of staff which was shown to new staff during induction but we felt this method of environmental education was inadequate. When the issue was raised with BHP they had already recognised the inadequacy of the present system and were working towards a new method of environmental awareness raising for the staff, Case Study 2.

#### Case Study 1- Blue Circle Southern Cement Ltd (BCSC)

The limestone mine is situated in South Marulan in the Southern Highlands in the Mulwaree local government area. It is above Bungonia creek which flows into the Shoalhaven River above Tallowa Dam. The adjacent State Recreation Area is a popular bushwalking and camping area as well as having attractive viewing platforms of the Shoalhaven gorge attracting an increasing number of visitors each year. (figure 1.)

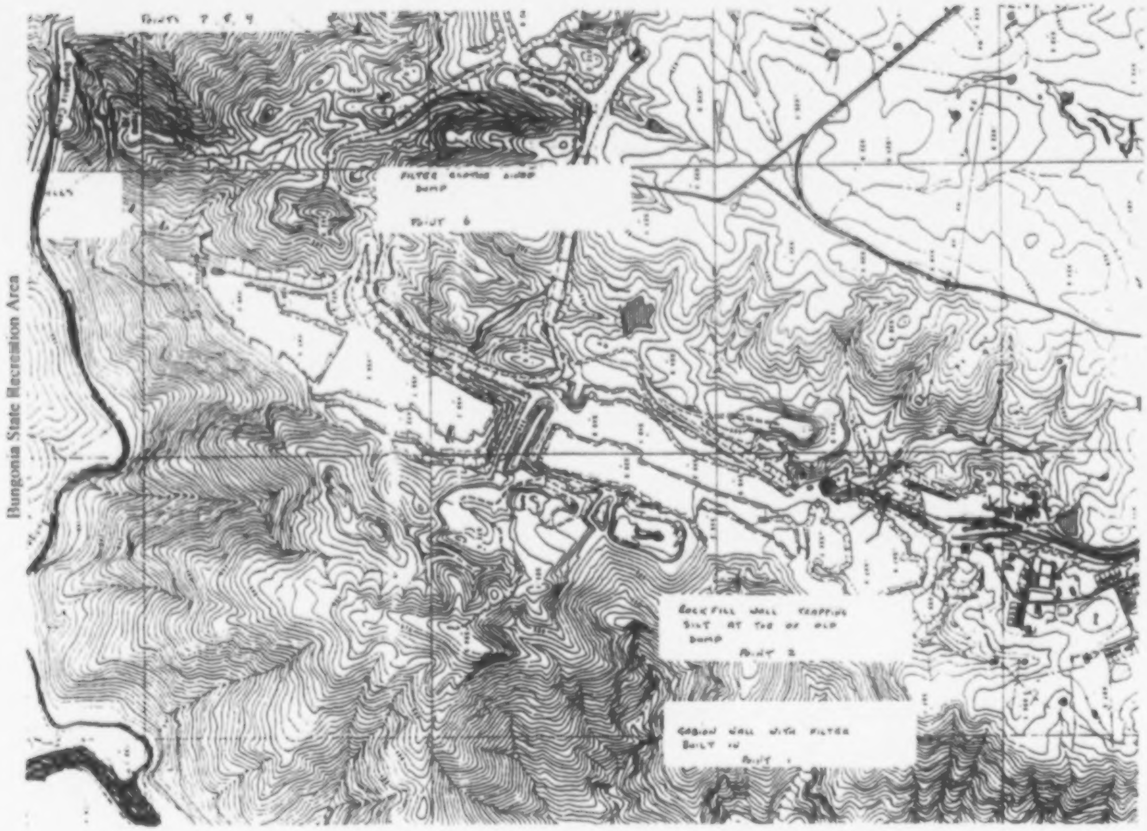
Bungonia State Recreation Area
POINT 7, 8, 9
FILTER ... DUMP
POINT 6
ROCK FILL WALL TRAPPING SILT AT THE ... OF OLD DUMP
POINT 2
GABION WALL WITH FILTER BUILT IN
POINT 1

Figure 1. Map of BCSC environs

The management of BCSC was approached to discuss the problems with the site and its environmental sensitivity and the EPA offered to give a presentation to management and supervisory staff on the site about the general and specific issues of environmental duties and responsibilities. A number of suggestions was made including the education of the staff about environmental awareness and how this could be achieved.

Options for training the staff were presented including contracting ITC or TAFE. BCSC's preferred option was for the EPA to train a trainer over a two day period. The trainer selected was Mark Jones, Superintendent for Safety Training & Personnel for the site. The EPA saw this as a good investment of time as a pilot. Mark prepared a draft training program (Blue Circle Southern Cement Marulan South, 1996) and, after consultation and comment by the EPA, conducted the course with the staff at the Marulan mine with the opportunity to provide the course to the staff at the other two sites at Berrima and Maldon. To ensure that the

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program continued to gain support from BCSC management, the training was incorporated into the company's pollution control licence.

As a result of this process it came to the attention of both off and on site managers that they were not familiar with the provisions of the licence for the Marulan site or the other two sites. The licence is the document that specifies the conditions under which the industry can operate and sets the limits to which the site can pollute without breaching the law and incurring a fine. So the process resulted in immediate education of the managers, the *Environmental Awareness Training Programme* being designed and implemented and the process expanding to include the other two sites.

BCSC intends in the future under a total quality management scheme to restructure the staff to work in units and the EPA suggested this may be an opportunity to put in place a system of keeping environment on the operators and supervisors agenda by having Environment Coordinators identified as important members of the team in a similar way to the way that Occupational Health and Safety (OH&S) is supported. This idea was taken on board to be considered in the restructure planning.

### Case Study 2 - BHP Steel Flat Products Division Port Kembla (BHP)

When BHP were approached the management indicated that they had already identified a need to upgrade the existing environmental awareness training and had examined ways in which the environment could be made an ongoing concern of all staff.

An interactive CD rom was chosen as the new method of training staff. The package was composed of both general environmental information as well as site specific information and could be used by staff with different levels of both English and computer literacy. At the end of the session there is a small test of their knowledge combined with the correct answers. On completion of the test each member of staff is given recognition by being entered onto a database as trained in environmental awareness and BHP hope to have all the staff on the database by the middle of 1997.

BHP will be supporting the program by installing a computer at ten locations at the Port Kembla site for on the job access by staff. In addition they have already put environmental responsibility on the duties of the majority of section managers and hope to have it written into the duties of work teams in the future in preparation for an EMS.

The BHP site at Port Kembla (Figure2) has 9,500 staff to educate and the use of computer technology is an innovative way of overcoming the difficulties of the task. However this is not available to smaller industries as the price of producing the interactive CD rom is significant for this large employer and they are hoping to sell it to other parts of the organisation to cover some of the production costs.

The South Coast Region of the EPA has been approached by BHP environment managers for assistance with the development of educational material for use in their overseas plants to educate the staff. In some countries this needs to start with basic environmental awareness training before training about the issues for the specific site can begin.

PORT KEMBLA
STEELWORKS

Figure 2. BHP Port Kembla site

## CONCLUSION

Environmental awareness education developed and implemented by industry to all staff in their place of work will result in an increased sense of responsibility towards the environment, resulting in a change in behaviour in the workplace with a flow on effect into the broader community as this knowledge and environmental responsibility is taken beyond the workplace.

The EPA will continue to encourage industry to educate the staff at all levels about their duties and responsibilities to the environment. Other papers presented by NSW EPA staff describe the work the EPA has done to educate small industry operators (Ford,C 1996) and to develop training programs with TAFE for industry (Kriflik,L). These projects reflect our commitment to environmental education for industry as an effective tool for protecting the environment.

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# SCIENCE, TECHNOLOGY AND THE ENVIRONMENT
## Interactive programs for primary schools

**Gayle Seddon**
**Science and Technology Education in Primary Schools (STEPS)**
**Department of Education Victoria**
**Level 8 Rialto South Tower**
**525 Collins Street**
**Melbourne Victoria 3000**

### SUMMARY

The Victorian Department of Education has recognised the need for primary teachers to have access to curriculum support, student programs and professional development in the use and implementation of the Victorian *Curriculum and Standards Framework* (CSF) and in particular the Science and Technology Key Learning Areas (KLAs).

*Science and Technology Education in Primary Schools (STEPS)* utilises an innovative learning technology, the Schools of the Future Network (SOFNet). STEPS comprises fortnightly interactive television programs for students in years P-2, 3-4, 5-6 (CSF Levels 1-4) and their teachers combined with extensive classroom support materials. Programs are linked to the learning outcomes for Science and Technology at the appropriate level.

Each one hour program is part of a four part series and is developed around a different theme each term for each CSF level. For example Level 1 and 2 *The Sea* and Level 4 *Threatened species.*

While the government policy priorities which initiated STEPS aim to improve student learning through support in science and technology, the philosophy and content of the programs and the support materials very strongly integrate environmental education. The use of environmental science investigations and environmental education teaching and learning strategies in the Science strands especially *Life and Living* and *Earth and Beyond* and the use of resource conservation in Technology strands especially *Materials* and the phases of investigate, design, produce and evaluate are examples of this approach.

### *What is STEPS?*

The Science and Technology Education in Primary Schools series of programs aim to stimulate the curiosity and imagination of primary school students and excite them about science and technology. The program consists of a series of transmissions to 1200 participating schools in Victoria and interstate through the Satellite Learning Network SOFNet.

The programs are based on CSF learning outcomes and are related to the appropriate level and organised under relevant topics, allowing teachers to integrate the STEPS program with other key learning areas such as Studies of Society and Environment.

The following planners demonstrate the themes chosen for 1996 and 1997 and the science strands and sub strands covered in each theme. Each program covers at least one of the technology strands, focusing on either, Materials, Systems or Information. Programs that have a direct environmental education component have been highlighted.

**1996 STEPS Planner**

| Years | Term 1 | Term 2 | Term 3 | Term 4 |
|---|---|---|---|---|
| CSF Level 1<br>Prep<br>CSF Level 2<br>Year 1-2 | Life and Living<br>Structure and function<br>Biodiversity and change<br>***The Sea*** | The physical world<br>Light and sound<br>*Communication* | Natural and processed materials<br>Reaction and change<br>*Food* | Earth and beyond<br>Our Place in space<br>***Night and day*** |
| CSF Level 3<br>Year 3-4 | The physical world<br>Light and sound<br>*Festivals* | Natural and processed materials<br>Reaction and change<br>***Going camping*** | Life and Living<br>Living together<br>Structure and function<br>***Feathers, fur and flippers*** | Earth and beyond<br>Our Place in space<br>***Seasons*** |
| CSF Level 4<br>Year 5-6 | Natural and processed materials<br>Reaction and change<br>*Forensic science* | The physical world<br>Force and movement<br>*Sports science* | Earth and beyond<br>The changing earth<br>***Natural disasters*** | Life and Living<br>Living together<br>Biodiversity and change<br>***Threatened species*** |

**1997 STEPS Planner**

| Years | Term 1 | Term 2 | Term 3 | Term 4 |
|---|---|---|---|---|
| CSF Level 1<br>Prep | Earth and Beyond<br>***Weather*** | The physical world<br>Magnetism, force and movement<br>*Toys* | Natural and processed materials<br>*Building it* | Life and living<br>***I spy in the garden*** |
| CSF Level 2<br>Year 1-2 | Earth and Beyond<br>***What's in the ground?*** | *Toys* | *Building it* | ***Animals in the backyard*** |
| CSF Level 3<br>Year 3-4 | Life and living<br>***On safari*** | Earth and beyond<br>***Mines, metals and minerals*** | Natural and processed materials<br>***Home chemistry*** | The physical world<br>*Toys and games* |
| CSF Level 4<br>Year 5-6 | Life and living<br>*Body parts* | The physical world<br>Force and movement<br>Electricity and magnetism<br>*Robotics* | Natural and processed materials<br>Earth and beyond<br>***Racing through water*** | The physical world<br>Light and sound<br>*Crime prevention* |

BEST COPY AVAILABLE

The course has been designed to allow students to participate in each program during the transmission and to interact with the teacher in the studio. The studio teacher introduces investigations, demonstrations and guest presenters. Classroom students are then encouraged to undertake their own hands-on investigations and share ideas with the studio teacher and audience via telephone, fax and email.

Whilst there are clear benefits in using the programs live, teachers may also wish to record programs.

The classroom teacher is vital to the delivery of the planned activities. An instructional partnership or team-teaching approach develops between the studio teacher and the classroom teacher as both share responsibility for different aspects of curriculum delivery. The role of the classroom teacher is to work directly with the students during their investigations and ensure that individual student needs are met and that all students maximise their learning opportunities throughout the series. Teachers have commented that it is useful to record students' responses and questions on a white board as the program is being transmitted.

Comprehensive classroom support materials are provided to each school participating in the STEPS program, including:
- expected student outcomes based on the CSF
- a list of resources required for each program
- a brief outline of the program format
- a detailed description of the investigations
- activities related to other key learning areas.

***STEPS and the Internet***

A web site has been developed to provide information about the STEPS series on the Internet which is part of the the Shools of the Future Web Science and Technology page. The web site provides teachers with up to date information about program topics and background information. Student and teachers can network their ideas and results of investigations via the on-line discussion pages.
The Internet address is **http://www.dse.vic.gov.au/steps/index.htm**

### *Implementing STEPS in your school*

The Science and Technology Education in Primary Schools (STEPS) program is now being received by over 1200 Victorian primary schools. Some interstate schools are also involved. The school setting, teacher background and individual needs of the students all influence the way STEPS is implemented.

Members of the STEPS team visit schools on a regular basis. It has become apparent that teachers employ a vast range of strategies to ensure STEPS is of most benefit to their students.

Here are some suggested strategies:

**Pre-program**

- read the teacher notes; highlight any key points or materials required
- complete any pre-show activity
- discuss the program topic; focus on the key words
- brainstorm a list of words that could be used in the program worksheets to aid in spelling
- ask the students their understandings about the topic and list their responses
- provide opportunity for students to choose groups or a partner for the investigations
- partially complete the investigations
- complete one related activity
- send a newsletter to the parents asking for assistance in the collection of scrap materials
- organise large boxes to store materials collected from student's homes
- set the room up with necessary furniture, equipment and white board/sheet of paper.

**During the program**

- view the program in a team teaching approach; two teachers can share the organisation and questioning
- ask appropriate questions
- record key words/phrases
- adapt any worksheets
- encourage a class response at Levels 1 and 2
- encourage individual/group responses at Levels 3 and 4
- encourage students to comment.
- phone or fax in responses

**Post-program**

- complete any related activities
- display the students models and written work
- provide the opportunity for students to orally present their model
- produce a language experience book
- integrate other key learning areas
- collect work samples for assessment.
- send examples of students work to the STEPS team

Teachers have mentioned that interaction becomes more meaningful to students when the class faxes or telephones the studio. It is advised that teachers only send one fax per class so that other schools have a chance to participate. Occasionally students and teachers may experience feedback during the phone-in section. Students using the phone should stand as far back from the television as possible and ensure that the volume is turned down.

Students may be involved in the program in a variety of ways, faxing or telephoning is one aspect. The students may also send in letters, a video or photographs of the class models/investigations or be involved as a studio presenter or audience.

Teachers have expressed great satisfaction at watching the program live and participating in the investigations during the off air break. Other class teachers prefer to tape the program and watch it at a later date. Viewing the taped program allows teachers to stop the tape and review key points and allow sufficient time to complete investigations. Large schools with more than one grade at a year level take turns in viewing the program live.

Teachers may wish to view programs from a previous STEPS series or may have missed taping a particular program. In both cases teachers are encouraged to consult schools in the local area and arrange to make a copy of the program. If teachers are unable to obtain a copy by this means, contact Terrie Garland on (03) 9628 4216 for a dubbing service.

STEPS programs are designed for a class of approximately 30 students. Some teachers have decided to undertake the program using a team teaching approach. This offers the support of two teachers to organise and resource the program. Some class teachers of P-2 students have enlisted the assistance of parents or have used a buddy system approach.

Class teachers that participate in the STEPS program organise a range of resources to be used by their students. It is envisaged that sharing some existing successful strategies used by other class teachers may assist in the implementation of STEPS in your school.

### *Integration of Environmental Education into STEPS*

Due to the nature of the curriculum in primary schools environmental education can be integrated easily into a science and technology theme and this has many benefits. The science and technology can be placed into a real life context. Values clarification, environmental problem solving and local action are all included in this approach.

The STEPS programs have been written and presented using a range of environmental education organisations such as the Marine Discovery Centre, Gould League, National Parks, Botanic Gardens, Scienceworks and Zoo education services. The opportunity to develop programs especially related to the Life and Living science strand of the Victorian *Curriculum and Standards Framework* has meant that environmental science is a strong theme throughout the programs.

The STEPS team will contact organisations for advice and resources when developing a topic. There is also an increasing use of outsourced writers from various organisations. This gives organisations with an environmental education role an opportunity to have input into the programs. Guest scientists and experts are also invited into the studio to demonstrate particular points related to the investigations.

Environmental education resources are constantly referenced and used as stimili for investigation ideas. Publishers and subject associations such as the Victorian Association for Environmental Education are referenced and consulted in the development of curriculum support materials.

Due to an increasingly sophisticated television viewing audience the STEPS programs are not designed to compete with commercial productions. The emphasis is student orientated and educational, however the entertainment value is also important and carefully considered.

If you would like more information please contact Gayle Seddon on (03) 9628 4319.

# Environmental Learning: New Techniques for Student Involvement?

G. L. Siepen

Department of Management Studies

University of Queensland Gatton College

Lawes Q 4345

## SUMMARY

The Wildlife Habitat Evaluation Program (WHEP) has expanded dramatically in its seven years of national operation in the US, against falling numbers experienced by youth groups generally (18 000 youths from 35 states participated in 1995). The program is based on sound learning and wildlife conservation principles. It provides young people with a structured and coordinated way of learning more about conservation principles and practices and well as developing the individual for later life. No competitive 'environmental' programs like WHEP exist in Australia. While the conservation and learning principles remain the same there is a need to adapt the practices to suit Australian conditions, species and management philosophies. Gould League, Double Helix, Rural Youth, Scouting Australia and landcare all offer possibilities for this type of learning program to be introduced. The question now is which type of organisation is the most suitable?

## INTRODUCTION

In the US interest in the conservation and management of wildlife species and their habitats increased after World War II with the introduction of the first university Game Management Courses. Since then much research and extension has been carried out on managing habitats to promote selected native species for hunting and for conservation of biodiversity. Training in these fields has been at university level or in the state and federal wildlife agencies. However, many children are keen to learn about conservation of wildlife species and management of their habitats. But how can this be done?

Firstly, children can initiate their own learning about this field and undertake some unpaid work experience with trained wildlife biologists and ecologists. However, this activity is very unco-ordinated and relies solely on the enthusiasm of the individual student.

A better method has been devised whereby youth can participate in an after-school program to learn more about this field. The major benefits of the program, called Wildlife Habitat Evaluation Program (WHEP) are that:

- it involves adults who act as coaches;
- these adults can undertake formal training in this field so they can assist the youths in a meaningful way;
- the program is very skills orientated with activities having learning and participation segments which are designed to be complementary - the practical activities reinforce the information gathered by way of reading and discussion sessions;
- students are provided with a manual which is uniform for all states in the US;
- students undertake activities in a 'competitive' atmosphere called contests - the aim of which is to undertake activities in a short period of time for maximum marks.

## WILDLIFE HABITAT EVALUATION PROGRAM (WHEP)

The WHEP operates under the 4-H Program. The term '4-H' refers to Heart, Head, Hand and Health - the four essential characters that are needed for all activities in life. The WHEP program is equivalent to Rural Youth in Australia and provides an avenue for young people in rural areas to undertake projects aligned with their school studies. The 4-H Program has many components of which wildlife conservation (via WHEP) is one. WHEP assists young people to learn more about nature conservation and how it can be applied to farm management, protected area management, endangered species recovery and conservation, management of animals for hunting and enhancement of wildlife in urban areas.

The Wildlife Habitat Evaluation Program began in 1977 in Tennessee, with the first contest held (in Tennessee) in 1987. The first national contest was held in 1989. The number of states and participants has grown to 35 states and 18 000 participants in 1995.

Local, state and national contests (for ages 14-19) are sponsored by university Cooperative Extension Centres which have close ties to state and national wildlife agencies. Staff from these institutions assist the coaches and the youths to undertake the exercises and activities (Benson, 1995).

Five activities are systematically used in state and national contests.

- Identification of common wildlife foods
- Interpretation of wildlife habitat from aerial photographs
- Prescription of wildlife management practices
- Developmet of a rural wildlife management plan
- Development of an urban wildlife management plan." (ibid)

Participants carry out these activities on a landscape scale. Outcomes may be reported orally or in the written form. For example, reporting interpretation of aerial photographs in which children are required to rank different habitats outlined on the photographs for two animal species is first done in the written form and then via a short (10 minute) oral presentation. "Accuracy of the reasons supporting the different ranking was paramount. However, poise, clarity, eye contact and other presentation skills were scored." (Siepen, 1996)

A state committee of biologists and extension specialists from universities and the United States Department of Agriculture (USDA) is usually formed to coordinate local and state contests, while a national committee (approx. 5-7) from similar backgrounds organises the national contest. Coaches' input is welcomed. A more detailed account of the 1995 national conference is reported elsewhere (Siepen, 1996.

## SUITABILITY FOR AUSTRALIA

The concept of extra curricula clubs helping young people to learn more about different issues and topics about the environment in Australia is not new. The Gould League has operated for many years with the assistance of the government education agencies. It has built up a fine reputation for supplying accurate and appropriately presented information about conservation and species. The Double Helix Club, with backing from CSIRO, has grown enormously over the past 10 years, concentrating on helping students (mainly 13-18 years of age) undertake projects that are both stimulating and relate to their school studies. However, there has never been a club or an emphasis in these and any other clubs specifically on nature conservation.

Local frog, bird or field naturalist clubs are organisations which can help young and, not so young, people have fun while learning more about the natural environment and wildlife species. However, these clubs usually do not offer an organised system for individuals to learn about conservation of species or management of natural habitats. Learning is undertaken haphazardly by people participating in the activities that are organised by the clubs and by listening to guest 'expert' speakers.

Rural Youth has been in operation for many years. It has been the only 'local young farmers' club that children living in rural areas can join. As its name suggests, social and learning activities have centred on rural production and development of the individual. Any reference to nature conservation has usually been as a result of the interests of the individual leaders in the region or district. However, the basic tenets of Rural Youth are almost the same as for the 4-H Club in the US (i.e. to develop responsible rural leaders).

Consequently, in Australia the opportunities for children to learn about conservation of species and natural habitat management has been left to the individual's enthusiasm and to the school system. In my 20 years experience in working in a government nature conservation agency, I have only ever seen children become involved in nature conservation because they have an interest in this field and because they are put in contact with an agency officer via a relative or friend. In almost all cases that I have been involved in the youth has eventually undertaken tertiary study and undertaken work experience during vacations, finally becoming employed in his/her chosen field in the conservation agency.

The Wildlife Habitat Evaluation Program offers a more coordinated, structured and scientifically-based approach to assisting young people to develop their skills and expertise by participating in extra curricula activities. Other benefits include development of the students' self reliance and confidence.

**Educational Materials**

To date several educational materials have been developed by Professor D. E. Benson (Colorado State University) and associates for the US program. They are:

- A Wildlife Habitat Evaluation Program Manual (Handbook) which is applicable across all US states and standardises the learning approach so that youths can compete equitably at national conferences
- A Guide for coaches
- Two training videos for teachers and coaches
- A display poster
- A correspondence course for educators

This type of extra curricula program concerned with learning about species conservation and natural habitat management could be a very useful addition to existing clubs and organisations that are concerned with development of skill, expertise and self-confidence of young people. It could be developed via Rural Youth, the Double Helix Club or Scouting Australia, or even through the landcare movement, as there is no similar program currently operating in Australia.

The educational materials produced for the US program would require adaptation for Australian conditions, species and management strategies. The US Handbook concentrates on game and non-game species management. Australian biologists, ecologists, educators and government conservation agency officers do not use these terms in everyday reference to conservation and management. The concepts in the handbook are sound. The details relating to Australia would need to be devised from existing classifications and management strategies.

The Wildlife Habitat Evaluation Program is based on sound knowledge of how people learn. There is both an andragogical and a pedagogical approach in the design of the program. The laws of learning (Malouf, 1994), namely that people will learn if:

They feel the need to learn

The learning environment is safe

They can set their own goals

They can participate actively in the learning process

There is two-way communication

They can see that the learning has been successful

The learners' experiences are built upon during the process

have been incorporated into the design of the activities. Each activity includes segments that meet visual, auditory and kinaesthetic learning styles so that participants with various dominant learning styles are accommodated.

**Youth Clubs**

Like all youth groups, Rural Youth seems to be declining in importance to young people. It has been noted that membership to all types of youth clubs has steadily declined since the 1960s both in Australia and the US. However, clubs like the Gould League and Double Helix Clubs still attract new members. Both types of clubs contain school teachers who assist the young people to complete their projects. Both organisations are nation wide and would suit the philosophical concepts of such a program.

Scouting Australia is a national organisation and a program such as WHEP could be incorporated into the "Conservation Badge" system to give the system a very practical focus, which is lacking at present. Scouting also has the services of leaders who could undertake training and guide the youth in their projects.

There is also a need to assist tomorrow's rural land managers with skills and expertise in decision-making about nature conservation concepts and practices as they relate to management of farms. Many rural landholders in Australia have minimal formal education qualifications. Subjects and courses at school and at tertiary level on nature conservation and habitat management have only been developed since the 1970s. Most learning by rural landholders has been done experientially on-farm and has concentrated on production goals (Siepen and Stone, in press). Younger farmers are undertaking tertiary primary industries courses, but these courses contain scant information about integration of nature conservation with property management and production.

## Landcare

It is only recently (i.e. 1995) that landcare courses have been offered at tertiary institutions. Many of these courses contain minimal reference to nature conservation, endangered species recovery and natural habitat management.

Landcare has grown exponentially since its official launch in 1989. In seven years the number of landcare groups has grown to 3 000, some groups covering 20-100 properties. Many landcare education programs (eg Pasturewatch, Waterwatch) have been developed in the last five years to encourage rural landholders to develop skills and expertise in sustainable natural resource management. Learning in these programs is done as a family activity and also as a school activity. Action learning in these programs is the key laerning method whereby children and adults can contribute valuable, reliable data to help in property management. As yet there are no Australia-wide nature conservation programs along the same lines as Pasturewatch and Waterwatch. Programs such as Beetlewatch and Weed Busters are mainly concerned with reducing the spread and increasing the control lantana species and weeds generally on rural properties. These programs have a close association with nature conservation but do not concentrate on nature conservation concepts and practices.

There is ample room to introduce a Wildlife habitat Evaluation Program into the landcare movement which will ensure national exposure and spin-offs to adult rural property managers.

References

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# INTEGRATING ENVIRONMENTAL EDUCATION ACROSS THE CURRICULUM:

# A REALISTIC GOAL OR AN IMPOSSIBLE DREAM?

Syd Smith
Chief Education Officer
Environmental Education Unit
NSW Dept of School Education

## 1. INTRODUCTION

In 1989 the NSW Department of School Education distributed its Environmental Curriculum Statement K-12 to all government schools. The document adopted the view that:

> "environmental education need not be seen as a totally new and separate subject but rather as an orientation or emphasis within the existing total curriculum. It is best approached as an across curriculum initiative. By integrating environmental education within broad key learning areas students can develop understandings, skills and attitudes which enable them to participate in the care and conservation of the environment.(1)"

The Curriculum Statement attempted among many things, to demonstrate how environmental education could be incorporated into various syllabuses. In the unit on weathering and erosion, for example, the document provided a list of "environmental perspectives" which showed teachers how people's actions affect the environment, how students can measure and record data from the environment and how they can design management plans for environments".(2) A set of suggested learning experiences was also provided including a problem solving activity, an investigation of past and future environments and an analysis of land degradation issues. Such exemplars were seen as useful and provided teachers with specific ideas on how to extend units of work with an environmental perspective at the classroom teaching level.

While these exemplars were helpful to teachers on the one hand, this approach encouraged a trend to perceive environmental education as an "add-on" or an after- thought and even in some cases, a tokenistic strategy to satisfy the requirements of a centrally driven curriculum statement. Looking at the big picture and developing key environmental education concepts and principles across the total curriculum were not clarified and to some degree the exemplars simply served as an unconnected collection of detailed work units. Teachers were given clear ideas about extending a unit of work by adding an environmental perspective but there was little guidance on developing an overall plan for environmental education across the total curriculum.

This fact was supported by a Quality Assurance Review of Environmental Education in New South Wales Schools in 1995 which acknowledged reasonable achievement by primary school teachers in adopting an environmental perspective across the curriculum but was less enthusiastic about secondary teachers who appeared to have had success only in the Science and Human Society and Its Environment Key Learning Areas.

> "The majority of principals and teachers in primary and high schools (70%) considered that 'environmental education is taught within key learning areas where it is seen to fit more appropriately'. Half of primary school

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(1) p.5, Environmental Education Curriculum Statement K-12, 1989.

(2) ibid p.85

**teachers and three quarters of the high school teachers surveyed perceive that environmental education is taught mostly by teachers who are interested in it.**(3)

Details of principals' and teachers' responses to the implementation of environmental education in respective key learning areas is summarised in Tables 1 and 2.

**Implementation of Environmental Education in High Schools**

**Table 1**

| Key Learning Area | High School Staff | |
|---|---|---|
| | **Principals (%)** | **Teachers (%)** |
| Human Society and its Environment | 90 | 85 |
| Science | 80 | 85 |
| Technological and Applied Studies | 55 | 15 |
| PD/Health/PE | 45 | 22 |
| Creative Arts | 30 | 30 |
| English | 15 | 19 |
| Mathematics | 5 | - |
| Languages other than English | 5 | - |

Percentages are quoted for those indicating inclusion 'always' or 'often'. Other response categories were 'occasionally' and 'never'.

**Implementation of Environmental Education in Primary Schools**

**Table 2**

| Key Learning Area | High School Staff | |
|---|---|---|
| | **Principals (%)** | **Teachers (%)** |
| Human Society and its Environment | 83 | 86 |
| Science and Technology | 78 | 89 |
| Creative and Practical Arts | 40 | 47 |
| PD/Health/PE | 31 | 25 |
| English | 30 | 35 |
| Mathematics | 19 | 22 |

Percentages are quoted for those indicating inclusion 'always' or 'often'. Other response categories were 'occasionally' and 'never'.

(4)

The review also inferred that it was difficult to assure the system that an environmental perspective had been adopted by all teachers in all key learning areas since many schools had few processes and strategies to measure or record the effectiveness of their environmental education programs.

This paper presents a number of models which will help schools to improve their implementation of environmental perspectives across the eight key learning areas. Successful integration strategies are outlined using case studies from New South Wales schools. The paper also clarifies the similarities and differences between **cross curricular** practices and **integration** strategies and outlines some **best practices** which are operating in environmental education in New South Wales schools. After examining some of the difficulties in adopting a cross curricular approach, the paper concludes with suggestions on how these difficulties might be resolved in the future.

## 2. THE NEED FOR A BROAD STRATEGIC PLAN

One of the issues raised by the QA Review of Environmental Education in New South Wales Government Schools was that some teachers were not always conscious of when they were actually promoting environmental education in their teaching. The need for a broad plan to implement environmental education in schools would bring balance to the total curriculum and demonstrate the links across key learning areas without the problem of omissions, repetitions and duplication. At the same time the school would not see itself as the sole exponent of environmental education.

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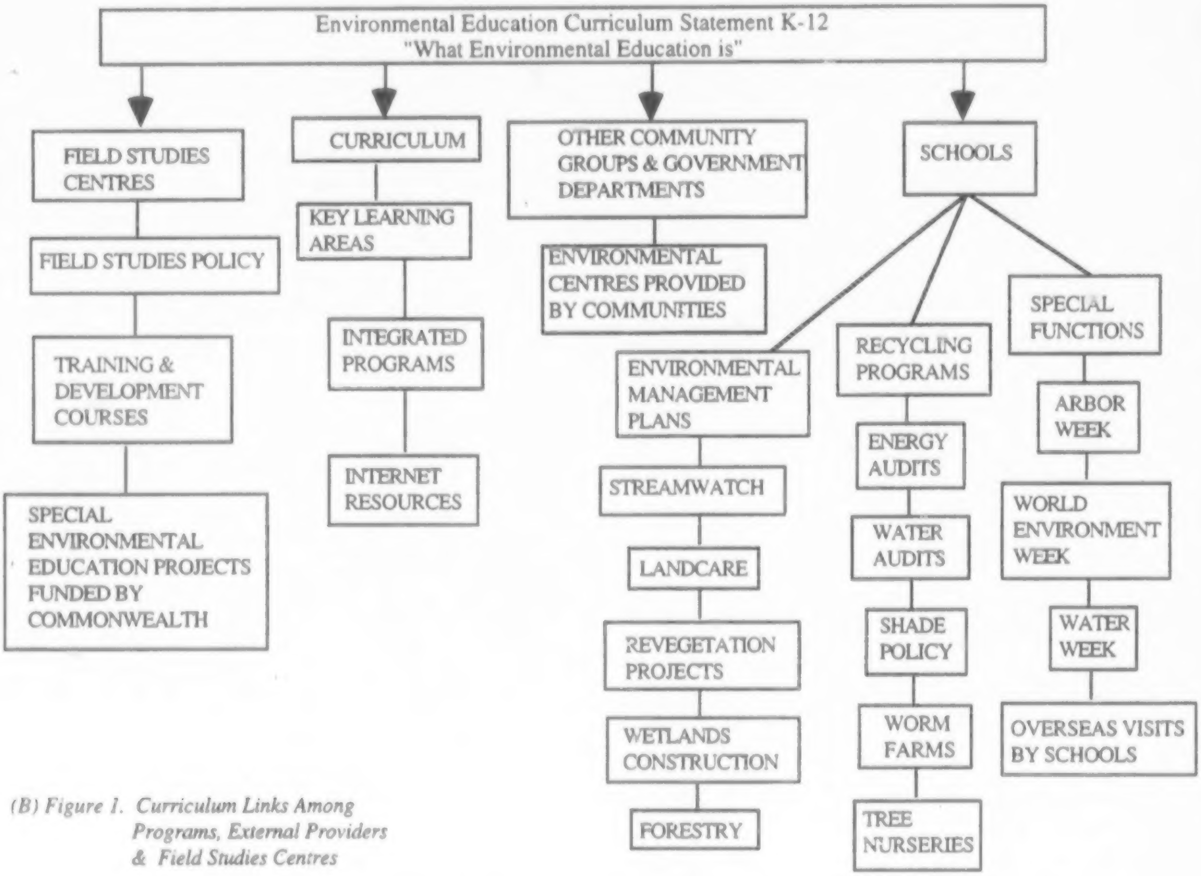
(3) p.13 "A Review of Environmental Education in NSW Government Schools" Quality Assurance Directorate, NSW Dept of School Education, 1995.

(4) ibid

**Environmental education can increase the capacity of the whole community to make informed decisions and to act effectively in addressing environmental and developmental issues. The school, therefore, is one of many important players in the community's goal to achieve ecologically sustainable development. This is illustrated in Figure 1.**

**ENVIRONMENTAL EDUCATION IN NEW SOUTH WALES**


Environmental Education Curriculum Statement K-12
"What Environmental Education is"
FIELD STUDIES CENTRES
FIELD STUDIES POLICY
TRAINING & DEVELOPMENT COURSES
SPECIAL ENVIRONMENTAL EDUCATION PROJECTS FUNDED BY COMMONWEALTH
CURRICULUM
KEY LEARNING AREAS
INTEGRATED PROGRAMS
INTERNET RESOURCES
OTHER COMMUNITY GROUPS & GOVERNMENT DEPARTMENTS
ENVIRONMENTAL CENTRES PROVIDED BY COMMUNITIES
SCHOOLS
ENVIRONMENTAL MANAGEMENT PLANS
STREAMWATCH
LANDCARE
REVEGETATION PROJECTS
WETLANDS CONSTRUCTION
FORESTRY
RECYCLING PROGRAMS
ENERGY AUDITS
WATER AUDITS
SHADE POLICY
WORM FARMS
TREE NURSERIES
SPECIAL FUNCTIONS
ARBOR WEEK
WORLD ENVIRONMENT WEEK
WATER WEEK
OVERSEAS VISITS BY SCHOOLS

*(B) Figure 1. Curriculum Links Among Programs, External Providers & Field Studies Centres*

If some schools are having difficulty in identifying commonly agreed environmental outcomes and have yet to coordinate and streamline their environmental education programs, then they are not alone.

> "Adequate mechanisms for collaboration or close links to other environment protection strategies are needed to realise the full value of environmental education. Environmental education in NSW needs a common vision and program of cooperative action. The value of environmental education can then contribute fully to outcomes for the environment and the community.
>
> There is a need for a more comprehensive and coordinated approach to foster developments in environmental education (5)

The last section of the curriculum depicted in Fig. 1 outlines a number of projects and programs developed by schools and their communities. Their links with our key learning area is not always clear. In fact, at times, one project may relate to a number of syllabuses at the one time. Recycling programs, energy audits and the celebration of key environmental events such as Arbor Day and World Environment Week all play a key part in the school's strategic and annual plan. To ascertain the role and function of these projects in the school's plan, it is necessary for teachers to be clear of their exact place in the curriculum and to evaluate their implementation and effectiveness on an annual basis. Until this is done environmental education will be incidental, ad hoc, unguaranteed and only considered intermittently.

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(5) p.20. 'A New Approach to Environmental Education in NSW', Discussion Paper, EPA of NSW, 1996.

## 3. MODELS FOR INTEGRATING ENVIRONMENTAL EDUCATION ACROSS THE CURRICULUM

A study conducted by Walker (6) showed that practitioners interpreted the curriculum as a set of ad hoc separate and interdisciplinary curriculum areas. The problem was one of the curriculum being manipulated and manoeuvred by competing interests and while classroom teachers played some part in the implementation process and how the curriculum was to be conceptualised, many of the decisions were made at system level.

> "These decisions focus on the basics - Mathematics and English. There is a space in the remainder of the curriculum. In the absence of a coherent curriculum theory that curriculum space is open to manipulation by the most competitive interests as any one time. Practitioners are left with the task of adjudicating between these competitive interests. The result is, for practitioners, a flavour of the month approach to curriculum planning and implementation.(7)

This confirms the need for a coherent theory of curriculum and the need for a whole school plan so teachers and administrators can develop and implement curriculum at systemic and practitioner levels to judge between competing theories (Walker 1985). A coherent curriculum theory for environmental education would mean there are agreed outcomes in school education that relate to the goal of environmental improvement.

Having determined the broad plan for the school and the role and purpose of environmental education within a coherent theory of curriculum, the practitioner is then faced with the issue of how to integrate environmental education across the curriculum.

Four across curriculum perspectives can be identified in this process. They are:

- **integration** • **parallel discipline** • **multi disciplinary** &
- **interdisciplinary concepts and topics approach**

**Integration** involves attempting to combine the knowledge of many subjects into broader areas of inquiry.

**Parallel discipline** involves teachers sequencing their lessons so they relate and respond to lessons in the same area as other subjects or key learning areas.

The **multi disciplinary approach** involves identifying a central theme and each subject area contributes separately to the theme from the perspective of the particular subject. The problem with employing this approach, especially in secondary schools, is transferring information content and skills from one subject area to another because of the boundaries that exist around subject areas. Teachers need to know the connections before they can support students in making the connections.

The **interdisciplinary concepts and topics approach** is well illustrated in Fig. 1 where schools have developed environmental programs relating to energy audits, Streamwatch and World Environment Day.

**Environmental Education** is one of six cross curricular areas in NSW schools and is similar in its needs to information technology, personal development, vocational education, literacy and numeracy. Environmental education is also a similar process to Futures Education which has been introduced as a draft syllabus in Queensland. One of the major challenges facing curriculum implementation in NSW is to incorporate cross curricular areas into a total curriculum which is already divided into distinct boundaries or is firmly but arbitrarily arranged into key learning areas.

Cross curricular issues have always been handled reasonably well in the primary school and, in particular, in early childhood education where the emphasis has always been on the different ways in which the same concept can be explained to young children (Warhurst 1994). While Bruner & Dewey did much to break down the separate subject boundaries in secondary schools, the cross curriculum process is still far from being deeply embedded within its curriculum.

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(6) Environmental Education, Teacher Education and the School Curriculum: **The Need for a Coherent Curriculum Theory**, Unpublished, 1996, UTS, Lindfield.

(7) ibid

## 4. DEVELOPING A FRAMEWORK OF CROSS CURRICULUM PRACTICES FOR ENVIRONMENTAL EDUCATION

In developing a whole school plan it is necessary to map the landscape of cross curricular areas, one of them being environmental education. This landscape may have a number of processes or entry points. Warhurst (1994) (8) identifies five which might be used for cross curricular development in schools:

- **content**
  This is not always subject specific and invites integration across different subject areas.
- **competencies and skills**
  Those developed by Mayer, Gardener and Hungerford provide an entry point because they relate to the total curriculum.
- **issues**
  Major environmental issues tend to relate to teachers in all subject areas.
- **organisational and managerial practices**
  As already noted in whole school planning, organisational and managerial practices affect the whole curriculum.
- **teaching and learning practices**
- **the culture and learning environment of each school**

The above cross curricular practices are partially useful as tools for establishing a framework for environmental education in that they emphasise the different parts rather than the interaction between them. Moreover by looking at the parts separately, it diminishes the whole which is an irony in itself. Case studies of environmental education in NSW schools suggest that schools do not adopt a single across curriculum perspective nor do they dwell on one process or entry point. When schools avoid fragmentation, programs tend to be more successful and this, to a large extent, is dependent on staff cooperation, collaborative planning and an excellent communication system among staff.

One successful case study where environmental education has been integrated successfully across the key learning areas is that of Harwood Island Primary School.

## 5. CASE STUDY OF A SUCCESSFUL INTEGRATED ENVIRONMENTAL EDUCATION PROGRAM IN A NSW SCHOOL.

### Harwood Island Primary School

Harwood Island Primary School, with an enrolment of 83 and a teaching staff of three, is approximately 700 kilometres from Sydney on the New South Wales North Coast.

The school has used environmental thinking as its entry point and as a major part of its culture and learning environment.

Student environmental awareness comes as a result of their developing literacy and numeracy skills through an environmental program. In addition students are empowered to plan and become actively involved in energy reduction and the reduction, reuse and recycling of materials and water within the school. Life skills, working cooperatively and problem-solving are all emphasised.

In 1988 a needs analysis of groups within the school was undertaken. As a result, children were asked to brainstorm ideas for what they wanted in the school. The principal realised that the children's ideas could be addressed through a cross-curricular perspective such as environmental education. The environmental projects which the children themselves suggested became the vehicle for purposeful learning and were integrated across all key learning areas. The ideas were prioritised.

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(8) p. 10 Warhurst J. **Understanding Cross Curricular Practice in Schools**, ALSA, 1994

Children had ownership of the ensuing environmental projects and were therefore motivated to work on them.

The things which children wanted included a jungle, secret places and a frog pond. Children's solutions to the problem of fund raising included such environmental projects as growing and selling vegetables, running a green canteen (where children make healthy specials cheaper, debate issues such as packaging and cleaning materials and make submissions to the P&C), setting up a lucrative recycling business and winning a prize for their efforts. They also shredded paper and used this for mulch and composting and then sold the surplus. They also applied for grants of money to undertake specific groundwork and plantings. Children wrote the submissions, planned the improvements, calculated their needs in terms of materials and finance, wrote to suppliers, used the telephone, fax and computers as required and documented their achievements. Record-keeping, including photos and reports, helped develop the student culture of positive environmental attitudes.

Many of the projects are run by student committees who supervise recycling, the greening of the grounds, the library and school canteen. The committees are taught to recognise problems, prioritise, handle correspondence, organise an action plan, keep minutes and write regular reports for the school newsletter. It is in these functions that the school is integrating its organisation and managerial practices with the whole school curriculum. In addition children seek help from people in the community with special expertise where they see value in their participation.

Having established its own wetlands area horticulture has become a key component of the curriculum. Lessons include, for example, mathematics and science activities, reflections on achievements and a range of practical tasks which are appropriate to the child.

Special environment events are also integrated across the key learning areas and are used as a focus for practical activities. World Environment Day, Water Week, Streamwatch, Bug Counts, Wattle Day and Arbor Week are celebrated on a whole-school basis. This illustrates Warhurst's issues entry point or process where issues can relate to all key learning areas.

## 6. OTHER EXAMPLES OF INTEGRATING ENVIRONMENTAL EDUCATION ACROSS THE CURRICULUM

### i) Competencies and Skills as Cross Curricular Approaches

Competence involves both the ability to perform in a given context and the capacity to transfer knowledge and skills to new tasks and situations (AEC and MOVEET, 1992:4). It is generally recognised that these competencies develop through effective participation in the life of the whole school, not through the study of a particular subject. They are very much cross curriculum issues and the responsibility of all those making up the school community.

The Mayer Report (1992) which was primarily concerned with key competencies for effective participation in the world of work cited seven competencies for all school leavers:

Examples of competencies being used as a means of integrating environmental education in NSW schools are listed below. All of these can have a bearing on environmental education and each can be integrated to take on a variety of forms from a parallel discipline approach through to interdisciplinary concepts and topics.

- Reporting environmental findings to the school newspaper (communicating ideas and information).
- Making paper (using technology).
- Surveying packaging of products sold in the canteen (collecting, analysing and organising information).
- Scrap metal reclamation for charity or for school projects (working with others and in teams).

- Weighing lunch wrapping and waste, graphing results, working out how to minimise this waste (problem solving).
- Using figures such as energy use of different appliances in Mathematics classes (using mathematical ideas and techniques).
- Establishing a campaign to promote desirable alternatives (planning and organising activities).

### ii) Multiple Intelligences as a Framework for the Development of Competencies and Skills

Gardner's multiple intelligences framework provides another example of an integrated cross curricular approach to teaching and learning, based on 'seven ways of knowing'.

Gardner's theory has implications for cross curricular development and environmental education in two ways.

First, teachers can recognise their students preferred "ways of knowing" and extend them into other domains and secondly, teachers can reorganise the curriculum in such a way that the seven intelligences become the basics through which teaching and learning takes place within the school.
Again environmental education activities conducted in NSW schools can be viewed from Gardner's different intelligences and can be used as a model for integration across key learning areas. Some examples include:

- studying literature with an environmental theme (verbal/linguistic intelligence)
- using readily available statistics on water used for various activities as a basis for maths activities (logical/mathematical intelligence)
- using art to present a message about conserving rather than wasting resources (visual/ spatial intelligence)
- Encouraging others to use warm clothing in winter (interpersonal intelligence)

## 7. CONCLUSION

Despite the overwhelming difficulties in developing a cross curriculum approach for environmental education in NSW schools, major projects have developed since 1989 with immense success. While much support has been given to teachers in developing units of work with an environmental perspective, there is now a major move to provide broad guidelines which will assist teachers in their strategic planning to include an environmental education component. Schools are now experimenting with new teaching strategies. Community groups, various agencies and government departments are funding stimulating and meaningful projects which schools have incorporated into their curriculum and teachers are being acknowledged and recognised for their innovatory cross curricular practices.

The NSW Board of Studies which is responsible for the development of all curriculum from Kindergarten to Year 12, recently issued a set of guidelines for syllabus writers, advising them of the need to consider environmental concepts when designing their syllabuses.

It is only when all syllabuses demonstrate how environmental education can be integrated into their documents or when a specialised Environmental Studies course is developed, that all teachers will feel confident and convinced that environmental education is an essential part of the total curriculum.

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# The Catchments, Corridors, and Coasts Program in Tasmania

**Dr Tania Stadler**
**Centre for Environmental Studies**
**University of Tasmania**
**GPO 252-78, Hobart 7001**
**Tania.Stadler@geog.utas.edu.au**

## SUMMARY

The paper will outline the background and rationale for the development of the Catchments, Corridors and Coasts (CCC) Program in Tasmania as a professional development course for teachers. The program is based on providing teachers with the experience of travelling through a Tasmanian catchment. The understanding gained during the program can then be incorporated into their teaching. The paper discusses the teaching strategies and the evaluation methods used.

## BACKGROUND

The "Catchments, Corridors and Coasts: Promoting a Landcare Ethic" program (CCC) was one of the six environmental education programs selected by the Australian Association of Environmental Education (AAEE) as part of the National Professional Development Program. These programs were intended to assist teachers with the implementation of the then recently introduced National Curriculum and will make a significant contribution to professional development at a national level.

The aims and objectives of CCC program in Tasmania are:

- To promote teachers' understanding of the concept of CCC as an interdependent system, embracing social, economic and natural aspects;
- To encourage teachers to focus on CCC in terms of a landcare ethic;
- To develop in teachers a clear understanding of the links between CCC as a teaching resource and the outcomes identified in key learning areas of the National Curriculum guidelines;
- To demonstrate a variety of teaching strategies, such as co-operative learning, journal writing, questioning, mentoring, and promoting links between experience and learning; and
- To develop networks to enable continued support and interest in landcare in education.

## THE CATCHMENTS, CORRIDORS, AND COASTS PROGRAM

The CCC Program developed from the Landcare for Teachers Summer School program which has been running at the University of Tasmania since 1990. It is a partly residential week-long course which actually takes teachers on a journey through a catchment, from the source of the Derwent River in southern Tasmania to its mouth in Hobart. The program is a natural extension of the earlier program and seeks to present teachers with information in a more cohesive way. The program has run in the summers of 1995 and 1996.

### Definitions

"A catchment is an area of land, bounded by natural features such as hills or mountains, from which all runoff water flows to a low point - like water in a bathtub flowing to the plughole, or water that falls on a roof flowing to a downpipe. In the case of a natural catchment, the low point could be a dam, a location on a river, or the mouth of a river where it enters the ocean" (QDPI, 1991).

The corridors of the program refer to the links between the upper and lower parts of the catchment, including the vegetation corridors which provide habitats and "highways" for wildlife, the river itself and, in the case of Tasmania, even the road system which connects the interior of the island to the coast.

The coast includes the sea shore, the dunes and beaches as well as the bays, estuaries, mudflats, salt marshes, cliffs and headlands. In Australia more than 80% of the population lives near the coast, with an even higher proportion in Tasmania (Thorp, 1995). Coasts are becoming increasingly recognised as important for values such as scenery, recreation, tourism, conservation and habitat, culture and heritage, for education and scientific research.

### Journey through the Catchment

The class met on Day 1 for an introductory session on the course, including a concept-mapping exercise (revisited later in the week as an evaluation tool). It was during this time that some of the links between environmental education and the CCC program were made with the formal school curriculum. The teachers were encouraged to start thinking about making links and continue to, throughout the week.

We set out before lunch and a few stops were made along the way to Lake St Clair. The first was to do some water sampling in the lower reaches of the Derwent River, where the water quality was at its worst. We progressively sampled at points along the route. The water samples were kept in clean glass containers and when lined up in sequence, it was obvious that the water became clearer the closer we got to the source of the river.

The highway was one "corridor" but another was on a farming property about halfway to the lake. This property had gradually degraded over the years, but recently the family owners have made a deliberate decision to make the farm more ecologically and economically sustainable. This has been achieved by taking an integrated 'landcare' approach which, among other things, has involved leaving native vegetation remnants, replanting it in degraded areas, and different methods of stock management. These strategies have resulted in 'living green corridors' which now contribute to benefits such as increased production as well as a better wildlife habitat. A visit to this property has proved to be a highlight on each occasion, largely due to the enthusiasm and long-term plans for the future communicated by the farmer. Most of the teachers, who are largely from urban backgrounds, came away with a greater understanding of the precarious balance between economic and ecological sustainability.

Continuing on our way, we arrived at Lake St Clair. The next morning, Park Rangers took the group on an interpreted walk, putting into context for us the geology, hydrology, and ancient patterns of human settlement of the area. In particular, the activities of the Tasmanian aborigines who had inhabited this island for about 40 000 years prior to European settlement, less than 200 years ago. The group split into three sessions, to focus on the areas of biodiversity, waterwatch (a water quality monitoring program), and threatened species - followed by a plenary sharing session.

After lunch, we regrouped back at the classroom to enable the teachers to focus specifically on curriculum projects for the remainder of the day. Having had some time to think and discuss, the teachers were ready to pair up, join a group or work individually to initiate a unit of work for their teaching purposes. The same happened the next morning, with forestry education officers leading a group discussion on curriculum links with forestry and technology issues. The trip back to Hobart had a production-forestry focus as we went into logging areas normally off-limits to the general public, where spirited discussion for and against various forest management practices took place. The day culminated in the return to Hobart after two days in the upper and middle parts of the catchment.

The following day was dedicated to exploring the coast and coastal issues. We visited a Coastcare group to look at some of the dune rehabilitation close to the city of Hobart and then visited a wetlands area to hear about the great ecological value of such areas which are often used as landfill sites. Coastal and marine issues such as developments were discussed throughout the day.

The course ended on Day 5 with more classroom work on actual curriculum units. A second concept-mapping exercise was given and showed a great increase in the participants' understanding of a catchment over the week. Key points which emerged from this exercise included the greater awareness of the the complexities involved in catchment management, a wider range of issues to include social, political, and cultural dimensions. Links were made to the curriculum areas of Science, SOSE, and Technology.

## Program Evaluation

Program evaluation was carried out by an independent professional evaluation, using a pre- and post-course "guided visualisation" technique as well as a post-course questionnaire (Hocking, 1995). On both occasions, the results showed a substantial increase in understanding of the complexities involved in catchment management as well as an awareness of the educational possibilities in using a catchment concept. The successful course aims included: the development of teachers' understanding of CCC as a complex system embracing social, economic, and natural features; the demonstration of a variety of teaching strategies; the development of networks to enable continued support and interest; and the development of teachers' concepts of CCC/landcare as a teaching resource. However, translating these understandings into an actual curriculum was difficult to achieve. In 1995, the National Curriculum was largely unfamiliar to the teachers so, as a consequence, the 1996 course shifted the landcare focus to a more practical, rather than the initial broader, perspective.

## Innovative Features of the Program

The idea for taking teachers on an actual journey through a catchment arose as a natural extension of the need to build on their existing environmental knowledge a and provide them with first-hand experience of a catchment, from mountains to coast. Some of the learning strategies used during the course include: creative visualisations or 'concept mapping', group focus sessions; and information-exchange and reflection time. As part of the experience, the participants were also asked to use a personal journal to record their feelings, responses, questions, and observations throughout the week, but particularly during the journey. An important feature was the need to include plenty of time for participants to reflect on what they were learning and seeing throughout the week, rather than seeing the course as just an extended "educational holiday". So, the timetable was organised in such a way as to provide time for individuals to spend by themselves, reflecting and entering their thoughts, questions, and insights into the journals provided for this purpose. This aim was only partly successful, due to time constraints and some reluctance on the part of the participants to use the journals.

## CONCLUSION

Since its inception, the CCC program has proved itself to be readily transferable to catchments in other areas and has been adapted for other Australian states. The CCC program provides teachers with a comprehensive understanding of the complexities involved in catchment management and the potential educational opportunities. As the program is used in different places and education systems, it can always evolve to meet specific requirements.

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# ENDANGERED THESES

Dr John J. Todd
Centre for Environmental Studies, University of Tasmania
GPO Box 252-78 Hobart Tasmania 7001

## SUMMARY

The move to pay-as-you-learn education for postgraduate coursework is threatening interdisciplinary theses. From the mid-1970s, during a period of rapid growth of Australian universities, new interdisciplinary postgraduate courses in environmental studies and environmental science were established. After about a decade, as a result of general tightening of resources following the Dawkins changes to the university system, there were moves to amalgamate these small departments or centres into larger, more conventional university departments. During this period there was also a welcome move to 'environmental' courses and research topics being offered in a wide range of disciplines. The most recent changes to the tertiary system, with non-business based postgraduate coursework severely threatened due to full-fees, are likely to lead to environmental research reverting to a much more disciplinary approach. It is argued that the significant reduction of interdisciplinary and transdisciplinary research will be a serious loss to Australia.

## INTRODUCTION

This paper argues that the interdisciplinary environmental thesis is threatened by the move to full-fees for postgraduate coursework degrees. To establish this case it is necessary to explain the differences between disciplinary and interdisciplinary research and then show that interdisciplinary, rather than disciplinary, research is threatened under the current changes to tertiary funding. It is also necessary to demonstrate that interdisciplinary research provides certain benefits, particularly in environmental problem solving, not offered by disciplinary research. The paper uses the history of the Centre for Environmental Studies at the University of Tasmania as a case study to illustrate the more general points of the argument. It should be clearly stated at the outset that this paper is not suggesting any deficiencies in disciplinary environmental research, simply that interdisciplinary research offers different perspectives on problems which can be particularly useful in environmental issues.

## DISCIPLINES

The starting point is the premise that each academic discipline has developed a unique approach to problem solving and its own particular way of thinking about things. It seems the "gulf of mutual incomprehension" between literary intellectuals and scientists described by Snow in his 1959 Rede lecture at Cambridge (e.g. Snow 1969:4) has not been reduced after almost four decades, and occurs in varying degrees between most disciplines. These differences, reflected in difficulty of mutual understanding, are important because they reflect more than simply differences in learned skills, jargon and background knowledge, they are genuinely different thought processes.

Disciplinary research is the traditional tertiary approach, where each year of study becomes more specialised and draws specifically on the knowledge base of the previous year, culminating in the PhD which is intended to push back the disciplinary frontiers by making a significant contribution to understanding or knowledge within the discipline. Such research is essential if we are to increase our understanding of the natural world and human behaviour because the existing knowledge base is so great within each discipline that only highly specialised research can extend the disciplinary frontiers.

Multidisciplinary research breaks these boundaries of ever more specialised research effort, acknowledging that inputs from more than one specialised field may be necessary in dealing with practical problem-solving exercises. It is usually based around a core discipline, similar to disciplinary research, but draws on some aspects of other disciplines or other specialised areas in the same discipline. One example is the recently announced Special Research Centre for Ore Deposit Research at the University of Tasmania. The Director describes the Centre's research programmes as 'multi-disciplinary' (Mercury newspaper, Hobart 14/11/96, p80) covering a range of specialised fields such as volcanism, magmatism, mineralisation, and crystallistation.

Interdisciplinary research moves away from the notion of a single disciplinary base for research and attempts to address problems from a perspective drawing on two or more distinct disciplines. This may be done through a team approach to research, with individuals from several disciplines working together on a common research project. Alternatively, one person may be trained in more than one discipline in order to conduct the research. At postgraduate level the preparation for interdisciplinary research must take one of two forms: either training in interdisciplinary group research (i.e. how to work effectively with people trained in other disciplines); or training the individual in a number of disciplines (i.e. how to use the knowledge and problem solving doctrines of several disciplines). In both cases, the dissimilarities in the way different disciplines approach problems and conduct research must be emphasised.

Transdisciplinary research carries the sequence of research approaches from disciplinary specialisation to its other extreme - avoidance of the constraint of disciplinary approaches all together. This is difficult to achieve in practice because the present structure of the education system compartmentalises knowledge from the start and so students entering postgraduate study usually have well formed disciplinary thought processes. To break this mould requires a total commitment to a particular problem or issue rather than the notion of extending knowledge within one or more disciplines. But this does not 'rest easy' within the traditional university approaches to research, particularly in the area of peer review for thesis examination purposes.

Multidisciplinary research may be conducted quite satisfactorily within a conventional university department or school structure. It may require supervisory input from more than one specialist. In some cases, students may do some coursework outside their discipline in order to learn certain skills which cannot be taught within the 'home' department. But, essentially it fits the pattern of a conventional research higher degree. In fact many departments encourage, and benefit from, a proportion of multidisciplinary research within their cohort of postgraduate students. Such degrees do not appear to be under threat at present, other than the hardships caused by general decreases in tertiary sector funding to most Australian universities.

To provide adequate intellectual and material support for interdisciplinary and transdisciplinary research requires quite a different emphasis within the department or school structure. Rather than concentrating academic staff with similar disciplinary backgrounds, as is the case in conventional departments, it is necessary to provide as diverse a mix of staff as possible. In the case of environmental departments or centres, the common interest in environmental issues, rather than a discipline, is the thread that makes a common unit. At the Centre for Environmental Studies, for example, the five core teaching staff include a political scientist, a physicist, a psychologist, an agricultural scientist, and an environmental scientist. Others in the Department who regularly contribute to courses include human and physical geographers, a botanist and a linguist. Postgraduate students embarking on research must be exposed to the ideas, skills and values of all these academic staff members. This can only be done through an extensive coursework programme of formal lectures, seminars and assessed work. Informal interaction with staff and fellow students, who also have wide ranging disciplinary backgrounds, is also an important component of the learning experience.

## STRENGTHS OF COURSEWORK

This need for substantial coursework prior to, or concurrent with, interdisciplinary postgraduate research is at the hub of the threat to such research. Since the mid-1970s, when interdisciplinary environmental postgraduate degrees entered the tertiary system, such degrees have been termed coursework degrees. They usually involve somewhere between 50 and 70 percent of the work load as courses with the balance a research thesis or project. But environmental science/studies is not the only type of coursework postgraduate degree. Far from it. Many other types of coursework postgraduate degrees and diplomas are offered in areas such as business, education, humanities, social sciences and sciences. In many cases they have a strong vocational emphasis, i.e. there are close links with industry or business. In education they are often linked to professional advancement and retraining.

Providing teaching in classes, rather than one-to-one training such as individual supervision of students, can be more 'efficient' provided class sizes are large enough, about 10 to 15 seems to be a reasonable minimum. The reason efficiency only become apparent at this size is the more formal structure of a lecture course, with more preparation required than for one-to-one teaching and the continued need for individual assessment. Productivity at universities has increased substantially in recent years. In the Department of Geography and Environmental Studies at the University of Tasmania, we have a target of 20 'weighted, equivalent, full-time students' per staff member, about double what it was 10 years ago. There are many University departments across the country with still higher student/staff ratios. It might be argued that we are already efficient, perhaps too efficient. For this reason it is not possible to 'carry' courses which are inefficient. If numbers drop below a critical limit, courses must be dropped, there is virtually no flexibility left in the system.

The difficulties associated with maintaining a minimum viable class size can become more pronounced during times of uncertainty and rumour. For several years the rumours and 'discussion' about full fees for coursework postgraduate degrees and diplomas have been rampant. This has made it difficult to plan or advertise courses more than a few months ahead. If full fees are charged there is no doubt that most Australian students would be unable to do courses such as environmental studies (as discussed further below). This would leave just the overseas students. In our courses we usually have around five fee paying overseas students in our coursework postgraduate courses each year. Despite considerable promotion, these numbers have remained quite constant for the past five years. Thus, if the cohort of local students disappeared, it would not be possible to offer these courses to overseas students alone. Could these overseas students be transferred to conventional research degrees? Our experience suggests that they could not.

- The support and informal assistance provided through mixing with local students in regular classes is enormous. Those students arriving from overseas and working by themselves on research projects have consistently had more academic and social problems than those participating in coursework.

- Students with good academic achievement in many other countries (our experience is mainly with students from South-East Asia and the Pacific) do not necessarily have a good understanding of investigative research principles necessary for Masters or PhD thesis research. Postgraduate coursework provides the training in critical thinking necessary for successful individual research for such students.

- Work done for assessment during coursework allows academic staff to identify strengths and weaknesses in students academic skills and makes advising on suitable research topics for the research component of the coursework degrees much easier.

A third reason for a substantial coursework component in interdisciplinary postgraduate degrees (i.e. in addition to the exposure to different disciplines and the benefits for overseas students) is the opportunity it presents for students to change disciplines. Our experience is that many students doing these courses are making a career change (for mature age students) or seeking a change in discipline (for recent graduates). The interdisciplinary coursework degrees allow such a change without having to start a tertiary course from scratch. In the case of environmental postgraduate degrees the range of possible changes in career direction are enormous. A few examples include students with a science background who may be looking to move into environmental policy formulation (i.e. social sciences) or seeking a different specialisation within the science area (e.g. from botany to energy conservation). Humanities graduates may be seeking a move into a career with field work (e.g. park ranger) or pollution monitoring. Such career changes have proved practical provided a suitable tertiary teaching package is available (i.e. a combination of coursework and research).

Having established that there are a number of benefits of interdisciplinary courses it remains to show why they are under threat.

## THREATS TO POSTGRADUATE COURSEWORK

The coursework postgraduate sector has been targeted as expendable or capable of sustaining enrolment through full fee recovery. The University of Tasmania, for example, had to budget for a loss of 380 postgraduate places due to funding cuts and, according to an August 1996 newspaper report (Mercury 15 August 1996, p. 7), decided all 380 places should come from the 420 postgraduate coursework places (full-time equivalent) currently offered. The justification was that "[p]ostgraduate coursework is not original work and unlike pure research work it does not advance knowledge in a given field". Similar cuts to University postgraduate coursework places are occurring across the country.

Any move to cut education opportunities in Australia will obviously be subject to a community backlash, and so from the political perspective it is necessary to have some response which gives an impression of logic behind the cuts. In the case of cuts to postgraduate coursework degrees, two arguments are used to justify the decision: one is the "not as good as pure research" argument reported above; and the other is the "financial gains associated with coursework justify charging fees" argument discussed further below. It is important for a politician to be able to offer a justification, even a dubious justification, for cutting funding to anything, and perhaps this accounts for the relatively minor public outcry regarding these cuts to coursework.

Both justifications are, of course, mischievous. Coursework postgraduate degrees are different to, not inferior to, pure research degrees. The inclusion of human values in environmental courses offered to scientists, for example, gives an added dimension to the whole learning and research experience (Hay et al. 1986). It seems strange to conclude that this added breadth somehow makes the research less original. A brief examination of the financial argument shows it to be just as insubstantial. For the full-time student basic living costs must be met. Postgraduate scholarships for coursework degrees disappeared some seven or eight years ago (the first of the 'attacks' on coursework). This means students must first have access to around $15 000 per year for basic sustenance. These funds are either provided from savings, part-time work, generous parents, or supportive partners. In each case there is considerable hardship. To almost double the annual cost by imposing fees of $12 000 to $14 000 would make participation impossible for most students. A 'straw poll' of 14 current students in environmental studies at the University of Tasmania indicated none would have been able to do the degree if full-fees had been charged. Nine supported themselves through casual work (wholly or partially), three had some parental support, three used savings from earlier full-time work, one was on a pension and one was supported by a partner.

If self-support appears incapable of meeting the costs of both sustenance and fees, this leaves the option of employers paying for students to do the course, either full-time or part-time. Many graduates move into some form of public sector employment. Thus we have to look to the government anyway for supporting the training of their potential new staff. To suggest that Environment Tasmania should fund, say, ten places a year (five in each of the two years of the Masters course) at around $300 000 is absurd. Environment Tasmania is short staffed, lacks basic equipment and is itself having to deal with funding cuts. For Environment Tasmania to fund even one place at the University seems highly unlikely. So the possibility of a class of full-time students supported by their current or potential future employers seems out of the question.

Part-time study remains the only option left to students wishing to do such courses. But this too has several serious barriers. In Tasmania the pool of people employed in environmental positions seeking a postgraduate qualification is too small to sustain the courses. Around 10% of current students in our courses have full-time employment and study part-time. Even these find it awkward to get sufficient time off for doing courses. They are often unable to participate in valuable field trips to industry, waste treatment plants etc. They also lack the informal interaction with other students and staff that the full-time students benefit from. Also, if full fees are to be charged, it will not be easy to find $7000 a year for four years when on a salary of around $25 000. The employer may be willing to cover these fees, although this appears unlikely for the same reasons as above.

## EDUCATIONAL DIVERSITY - MAINTAINING THE THESES

There seems to be a lot more logic in having places made available through DEETYA funding (Department of Employment, Education, Training and Youth Affairs, the Commonwealth Department responsible for funding public universities in Australia). Even if the principle of user pays is applied it still makes sense because the sort of training that these students obtain is usually of greatest benefit to the public sector, at all three levels of government.

At the University of Tasmania, we have been fortunate in maintaining DEETYA funded places for environmental studies postgraduate coursework for 1997. The University chose to keep these courses in its teaching profile. Other similar courses at other Universities, e.g. the Master of Environmental Science courses at Monash University, have not been so fortunate (at least at the time of writing this paper). But even where courses have maintained DEETYA funding, the threat of future cuts remains very large. From a political perspective, as the number of postgraduate coursework degrees across the country diminish, the remainder become more readily expendable (less students/staff to kick up a fuss).

The prospect of closing off postgraduate coursework degrees in environmental studies is a sad one. The courses have been running successfully since 1975 at the University of Tasmania. Student demand for places has been excellent. Productivity has been high with good publication records and outside research funding. There is no indication of an oversupply of graduates with this form of environmental training. It is worth noting that external research funding is quite a different issue to funding scholarships. The research funds provided in relation to postgraduate coursework are usually relatively small amounts to meet the costs of particular research projects, e.g. to pay for chemical analysis or travel associated with field work. The research funds facilitate a service to the community provided by postgraduate students rather than any direct financial gain to the students or the University. In other words, these courses provide a pool of highly capable people to address environmental problems as part of their research training. Another reason for DEETYA funding of this type of coursework place in Universities.

The community benefit of interdisciplinary/transdisciplinary research undertaken as part of coursework degrees should not be underestimated. It is usually problem orientated, addressing issues of current community concern or interest. Neither the CSIRO nor government departments are in a position to do its sort of research without substantial inputs of public money. A tiny selection from the 25 to 30 research projects undertaken by coursework students at the Centre for Environmental Studies each year include: a study of the technical and social aspects of composting toilets which has since led to a major international programme of dry toilet installations in several Pacific nations (Crennan 1992 ); a pioneering study of Australia's management responsibilities for its sub-Antarctic islands (Keage 1981); a critical and controversial study of the environmental legacy of mining operations at Queenstown in Tasmania (de Blas 1992); and a current study of ethics in environmental consulting (Detterick in progress). It is unlikely that any of these theses, or many of the hundreds like them done over the past 20 years, would have been done under a conventional disciplinary postgraduate degree system. If they now cease, the loss will be significant, to the community, to the individual and to the University.

## CONCLUSIONS

This paper has argued that research as part of postgraduate coursework degrees is valuable, both for its academic merits and community contribution. It provides a flexibility not possible in conventional disciplinary research and addresses topics which can only be offered through an interdisciplinary/transdisciplinary framework. If numbers of students drop significantly, these types of courses cannot be sustained. If full fees are charged numbers will drop. Since many graduates move into government positions, it is largely a government responsibility, rather than private enterprise, to maintain courses.

It is not yet clear how many courses across the country will have to charge full fees. Some with strong business links might survive without DEETYA funding, but the others are clearly threatened. It seems appropriate to take note of the approach taken to manage endangered species - ensure their habitat is maintained and population numbers do not drop below sustainable levels.. The analogy is that the interdisciplinary departments or centres must be maintained and that DEETYA funding must be continued to sustain numbers. As with habitat management, different locations, i.e. different universities, will require different approaches on how best to sustain the system. Without some commitment by the managers, i.e. governments and Vice-Chancellors, the interdisciplinary/transdisciplinary thesis may be lost, while really it deserves a place as part of the diversity of tertiary education options.

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# PRE-SERVICE AND IN-SERVICE TRAINING OF TEACHERS IN ENVIRONMENTAL EDUCATION: WHERE TO NEXT?

**Dr Kim Walker**
**University of Technology, Sydney**

## Introduction

The significance of teacher education has been seen by many as the key to the successful development of environmental education. This need was identified in the seventies by Greenall (1981) in her national study of environmental education in school education. At the time Fensham (1977) also emphasised the need for environmental education in teacher education, claiming that teacher education programs in secondary schools should cater for the interdisciplinary nature of environmental education.

At the international level, a series of studies and reports were produced during the 1980s as part of the UNESCO-UNEP International Environmental Education Program (1987). The authors of the reports concluded that there were few well structured teacher training programs available. They also emphasised that the provision of environmental education in teacher education was disparate both between countries and within countries.

In the nineties researchers continue to emphasise the need for environmental education in teacher education. This research includes the extensive work of Fien in developing both a theoretical position on the teaching of environmental education in teacher education Fien (eg Fien, 1993) and models of implementation. Other work includes the development of environmental competencies for environmental educators (Queensland Board of Teacher Registration, 1993), strategies for incorporating environmental education in teacher education (Scott, 1996) and adopting a problem-based approach to the teaching of environmental education in teacher education (Walker, K., 1995).

## Environmental education in teacher education in NSW

A comprehensive study of the provision of environmental education in primary teacher education in New South Wales has been conducted by Phipps (1991). She attempted to firstly establish that there is a need for environmental education in teacher education. She did this through her study of primary classroom teachers, specifically looking at their teaching of environmental education and their initial training in the field. She identifies the competencies required of an environmental educator and from there assesses, through a series of questionnaires, whether in fact teachers were given the opportunity to acquire these competencies She claims that preservice teacher education and professional development are the most appropriate manner in which to acquire these competencies.

Having established that the teaching of environmental education was inadequate and that few teachers had received any training in the teaching of environmental education she researched teacher education programs in NSW. Phipps's (1991: 103-147) findings include:

* all universities offer some form of environmental education at some stage in their pre-service programs;

* not all programs are carried out in a manner consistent with the environmental education literature;

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* environmental education is often offered as an elective and is frequently only included in a course because of a lecturer's individual efforts;

* environmental education is sometimes not offered until the fourth year of a Bachelor of Education so teachers exiting with a Bachelor of Teaching after their third year are not given the opportunity to study environmental education;

* there is a substantial number of teachers who enter the teaching profession without any formal training in environmental education;

* anticipated course revisions suggest that students will have a greater access to environmental education subjects; and

* where environmental education is taught as an integrated subject it is mostly associated with science or social studies subjects.

Phipps concluded that while teacher training in environmental education has improved over the last ten years it is still less than satisfactory. Phipps makes links between this lack of preparation and the provision of preservice education and professional development. Her study suggests that while environmental education is now increasingly incorporated in teacher education there is still room for a great deal of improvement and at present there is little evidence in the schools studied which reflects the changes in teacher education.

In 1993 the then NSW Minister for Education, Mrs Virginia Chadwick, launched a statement on the teaching and learning of environmental education in NSW schools. One result of the statement, *A new focus on environmental education* (Department of School Education, 1993) was the establishment of the Ministerial Advisory Council on Environmental Education (MACEE). It was the responsibility of this advisory council together with the Ministerial Advisory Council on Teacher Education and the Quality of Teaching (MACTEQT) to conduct a review of environmental education in teacher education and report their findings to the Minister.

As part of this inquiry MACEE commissioned a survey of pre-service, post-graduate, continuing education and in-service subjects offered by faculties/schools of education in subjects directly related to or include some components of environmental education (Walker, J., 1996).

## The study

The survey instrument used in the MACEE study consisted of an adaptation of the questionnaire developed by Phipps (1991). There are two main sections in the MACEE survey: the first is concerned with the structure and duration of environmental education subjects, the second with the content of these subjects.

The responses to the survey provide some understanding of how environmental education is incorporated in school education courses, the content of subjects, pedagogy and advice given to students on how to incorporate environmental education in their teaching programs. The survey did not provide information on the actual delivery of subjects to tertiary students nor how the tertiary students eventually teach environmental education in schools. The work of Carter (1990) and Walker (1995) is helpful here. The point being made is that information given about university subjects does not necessarily relate to how or what practitioners teach in schools (Carter, 1990; Walker, 1995) nor to what school students learn (Carter, 1990).

## Findings

The MACEE study aimed to determine the extent and nature of environmental education in teacher education programs in N.S.W. universities. A questionnaire was sent to 13 institutions, 11 responded. The responses vary greatly between institutions in the structure and content of

## The extent of environmental education in teacher education

The 11 institutions nominated a total of 56 subjects which they claimed had some environmental education content. An analysis of those subjects is provided in the following table.

Table: Analysis of subjects incorporating environmental education.

| Subject | Number |
|---|---|
| Policy | 1 |
| Humanities | 10 |
| Technology | 4 |
| Science | 18 |
| Agriculture | 1 |
| Other | 1 |

It is important to note that 28 of the 54 subjects are offered as electives. Many of the electives are dedicated principally to environmental education (17 subjects). This means that only three environmental education subjects are included in the core programs of the 11 institutions covered in this survey. The three subjects are offered in only two institutions. In 2 of those 3 subjects they are titled `The Changing Australian Environment'. An analysis of the content of those subjects suggests that the emphasis is on environmental problems and very little to no content covers skills in the teaching of environmental education.

These results show that in most cases where environmental education is offered as a separate subject it is as an elective and not part of the core teacher education program. It, therefore, can be assumed that many beginning teachers have never studied environmental education as a separate discipline (see also Phipps, 1991: 140). This issue is problematic given that environmental education is mandatory in NSW government schools (New South Wales Department of School Education, 1993).

In some cases there is no environmental education in teacher education courses. The result is that some students will graduate without ever having studied environmental education. Where environmental education is included in subjects in the core program the subjects are likely to be science and/or social science. In this situation students are often not given the opportunity to learn the range of skills required to teach environmental education as outlined in the NSW curriculum statement (1989).

Another issue is interdisciplinarity. The NSW environmental education curriculum statement (1989) states that environmental education is ideally taught across disciplines. Where environmental education is offered as a separate discipline in teacher education courses there is an opportunity for academic teachers to discuss how environmental education can be practically taught across disciplines in schools. As environmental education is generally not included in the core program of most institutions not all students would have the opportunity to learn the knowledge and skills required to teach environmental education across the curriculum. Moreover, according to the results of this survey, no students are being provided with a model of interdisciplinarity in environmental education. There is no evidence that environmental education is represented across a range of disciplines in teacher education programs; instead it is mostly located in the social sciences and science. The issue of how environmental education may be part of an English program, for example, does not appear to be covered.

## The nature of environmental education in teacher education

Respondents were are asked to comment on a listing of 23 attributes related to the teaching and learning of environmental education (see Appendix I). One may group the attributes in the following inductively generated categories:

- natural resources, energy and renewable and non-renewable resources;
- interactions between people and the environment and the implications of continued population growth;
- effective teaching strategies;
- problem solving;
- using resources including field studies centres.

An analysis of the inductively generated categories follows.

*Natural resources, energy and renewable and non-renewable resources.* Two universities had very little content in this area in their subjects whereas one university had considerable. The other institutions had some. The data suggests that there is more likely to be an emphasis in the science related subjects.

*Interactions between people and the environment and the implications of continued population growth.* There was no discernible pattern of inclusion or exclusion in this content area either within institutions or between institutions. It is perhaps important to single out the attribute relating to population growth given the potential seriousness of the problem in terms of the environment. The responses to the attribute *the social, economic and political implications of continued growth of the human population* suggest that there is no emphasis in 16 subjects, some in 25 subjects and considerable in 14 subjects. It is interesting to note that at one university there is no emphasis in an environmental education subject in the M.Ed.Studies course nor in the environmental education subject in the Dip.Ed course.

*Effective teaching strategies.* A pattern emerged in the data which indicates that in the main there was an emphasis on the skills of teaching environmental education in subjects that were principally related to environmental education. This was not the case at one university. In the 9 subjects listed by the university none had a considerable emphasis on effective teaching strategies in environmental education including the environmental education elective.

Another interesting issue emerged from the data collected from a different university. The subject `The Changing Australian Environment' (B.Prof.Studies) has been nominated as being entirely environmental education and while there is considerable emphasis on solving environmental problems there is no emphasis on planning teaching episodes in environmental education, teaching skills in environmental education, using environmental education resources or evaluating in environmental education. This response raises the question of how universities define environmental education.

*Evaluating in environmental education* is the attribute that received the least attention in the subjects listed. This finding may be related to the perceived difficulty of evaluating and assessing in environmental education.

*Problem solving.* An analysis of the data show no discernible pattern of subjects that may or may not include this attribute. One could make the assumption that this attribute would be emphasised in environmental education subjects. The data indicate that this assumption is false. At one university there is no emphasis in `Environmental Education K-6'. Similarly, at another university there is no emphasis in `Environmental Studies' and at yet another university there is virtually no emphasis in any subject.

*Using environmental teaching resources* Most respondents indicated that some emphasis was given to environmental education teaching resources, how to use them and where further information could be obtained. It is interesting to note that in 13 subjects there is no emphasis on providing students with the opportunity to understand the N.S.W. environmental education subjects. At one university Educational Elective A and Educational Elective B (Dip.Ed) are devoted to environmental education and yet there is no emphasis on understanding the N.S.W. environmental education curriculum statement.

## Implications of the MACEE study

The MACEE study raises many important issues, the most obvious being that we need to know more about the teaching of environmental education in tertiary institutions across Australia and then compare these findings with trends around the world. The NSW data suggest that environmental education is being taught in universities where there is a committed academic of group of academics. There is no agreed policy in teacher education which suggests that all students need the skills in teaching environmental education.

The issues raised in the MACEE study are perhaps even more cogent in the current political climate. An increasing emphasis by our government on literacy and numeracy, together with a silence on the notion of environmental literacy, suggests that environmental education will need to compete even more vigorously for a place in the school and teacher education curriculum.

The issue of competing for curriculum space is, I believe, further exacerbated by the cuts to tertiary institutions. Education faculties are being forced to become leaner and as such offer what one may call a `no frills' teacher education program. Unfortunately, the MACEE study suggests that environmental education is considered a `frill'. This leads me to question, `Where to next for environmental education in teacher education?'. Clearly environmental education needs to become core not `frill'.

## Conclusion

The MACEE study indicates that teacher education programs in NSW include some environmental education at some stage of their program. Such a response is expected given the emphasis placed on environmental education by the Department of School Education (1989, 1993), the federal government (Department of Foreign Affairs and Trade, 1984) and international organisations (Centre for Our Common Future, 1993). However, the inclusion of environmental education in teacher training is varied in structure and content between institutions.

The issue is that environmental education needs to become part of the core program in teacher education. In order for this to happen I believe that there needs to be an agreed commitment to environmental education in teacher education in tertiary institutions.

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# Working Greener: Industry, Education and Sustainability

**Lisa Walker**
**Environment Branch**
**Sydney Water**

## SUMMARY

Environmental management is likely to become an increasingly important measure of an organisation's performance. Environmental education of staff is an important part of any move towards an organisational culture which supports the principles of ecologically sustainable development (ESD). The work place is a culturally unique environment which requires its own approaches to environmental education. However, work-based programs are a neglected area of environmental education (Henning, 1984).

This paper discusses different approaches to work-based environmental education. Traditional 'technological' approaches which focus on meeting regulations are contrasted with approaches which facilitate analysis of environmental values and are likely to result in behavioural change. The paper draws some conclusions about educational strategies which are most likely to be successful in helping organisations move towards ESD.

## INTRODUCTION: THE NEED FOR WORK-BASED ENVIRONMENTAL EDUCATION

While appropriate education is essential for implementing responsible work practices, work-based programs are a neglected area of environmental education (Henning, 1984). Studies have found that awareness of environmental issues is weaker among adults, particularly older adults, than among the young and that many adults are not aware of the basic environmental impact of their own activities ( NIACE, 1993; Environment Protection Authority, 1994) .

Environmental education should not be a once in a lifetime activity but be continuous and recurrent as roles change throughout people's lifespan (NIACE, 1993). The workplace can potentially be an effective focus for adult environmental education. Every organisation, both government and non-government has a part to play in the development of environmental awareness and commitment.

> ' The large numbers of people linked with various types of organisations (staff, clients, suppliers, members, students, shareholders etc.) mean that many organisations offer an important avenue through which people can become involved in acquiring the knowledge, skills and commitment needed for the achievement of sustainable development (VEEC, 1992).'

From the organisation's point of view no major change in environmental management can come about without a change in organisational culture. The significance of each staff member as an integral part of an environmentally conscious team is emphasised by Winter (1988):

> 'Each member of staff is a 'cell' in the living corporate organism, and as such, no ecology-minded firm can operate effectively unless its workers are well versed in the environmentalist outlook. If a company is to adopt an environmentalist approach the employees represent the greatest threat to the project and its greatest potential aid to success'

It has been said that in ten years the market will be about *nothing else* but sustainability (Roberts, 1993). Legislation and public opinion have generated external pressures on companies to upskill their employees in environmental matters by including environmental considerations in their training programs (NIACE, 1993). However, few employers recognise the importance of this and environmental education for the workforce as a whole is rare (NIACE, 1993). Environmental Education is likely to become an increasingly important strategy for assisting industry towards sustainability.

## WHAT FORM DOES WORK-BASED ENVIRONMENTAL EDUCATION TAKE?

Watkins (1991) argues that learning in the workplace has several unique features: it is usually task focused, it occurs in a social context that is characterised by status differences and risk to one's livelihood, it is collaborative and often grows out of an experience or problem for which there is no known discipline or knowledge base and it occurs in a political and economic context characterised by a currency of favours and pay for knowledge. This unique culture of the workplace argues for approaches to environmental education which, while drawing from research conducted in other environments, are tailored for the workplace.

### Behaviourism

Learning in the workplace has traditionally been understood in terms of behaviourism which remains very popular within industrial and organisational psychology circles (Smith, 1992). The universal valuing of behaviourism in workplace learning is questioned by Marsick (1988), based on research which emphasises the importance of reflection in learning. Marsick (1988) summarises characteristics of the behaviouristic model for workplace learning as follows:

- it is behaviourally oriented with performance outcomes that can be observed, quantified and criterion referenced,
- personal and work related developments are separated,
- learning is designed on a 'deficit' model that measures individuals against standard, expert-derived norms.'

Marsick (1988) argues that a behaviourist approach is appropriate when workers are learning a precise technique that allows no variation, for example the construction of a complex piece of machinery. It is doubtful, however, if this approach is effective for environmental education.

Henning (1984) highlights that where environmental training is in place, many programs adopt behaviourist approaches by focusing on technological aspects of the subject matter, particularly through techniques and methods in specific areas, rather than environmental values or considerations on a long term basis. The objectives of these environmental training programs may not contribute to the values, concepts and perspectives of the participant for effective judgements and decisions in environmental affairs.' In many cases the assumed objectives may be associated with agency dogma, technique ideologies, or non-environmental concerns (Henning, 1984).

This approach to environmental education conflicts with that recommended by the World Conservation Strategy which argues that various values and alternatives should be examined and analysed on a long-range basis by public officials (IUCN, 1980). Henning (1984) argues that specialised training programs contribute little to attaining a '...comprehensive, internalised perspective which would include exposure to, and analysis of, environmental values and considerations '.

An example of an approach commonly taken to workplace environmental education is that of the Tennessee Valley Authority (TVA), a large natural resource management agency, who identifies what they believe to be four key requirements for a successful environmental education effort. Employees must be made aware of the problem, informed about laws and regulations which apply to the organisation's activities, instructed on specific steps they should take to comply with laws, regulations and company procedures and motivated to follow the prescribed procedures (TVA, 1993). It can be seen that these requirements focus on meeting regulations rather than a broad scale approach emphasising issues, values and ownership of the problem issue. In other words the 'how to' rather than the 'why?'

While technological approaches, such as these, are a necessary part of workplace education they are unlikely to contribute substantially to the long term changes that are necessary for the achievement of ESD.

### Constructivism

A different perspective on work-based environmental education comes from Bell (1993), a prominent constructivist, who outlines some principles for effective in-service training which can also be applied to environmental education. Constructivism is based on the concept of building from the starting point of what the learner already knows and believes. Bell's work indicates that education programs should provide an opportunity for learners to:

- discuss what they currently do in their job and to receive suggestions on alternative, environmentally supportive strategies,
- discuss how it feels to be changing the way they do their job,
- receive ongoing feedback on actions implemented as a result of the education program. This process of reinforcement is critical for success of the program,
- form a support network as they try to implement changes,
- explore the issue of factors that restrain their implementation of new strategies and how they can deal with them,
- explore the environmental knowledge, attitudes and beliefs that they bring to the program.

These principles provide the opportunity for learners to take ownership of the program by building from their current knowledge base. They also provide a framework within which cultural change in the organisation can occur.

### Example of a work-based program

The education strategies developed by the Victorian Environmental Education Council (VEEC) for the Parkroyal hotel and Linfox transport are examples of work-based environmental education programs which emphasise a broad scale approach and participants' ownership of the program These programs emphasise the following:

- *an action focus*: focus on practical actions to reduce the organisation's environmental impact,
- *wide involvement:* encourage a feeling of personal responsibility and ownership among all staff linked with the company by ensuring that every person has the opportunity to have a say in how the Strategy process is run; and encouraging each person to make and discuss suggestions for action, and ensuring their input is seriously considered,

- *from local to global:* focus on local issues (specifically organisation related) but link this with national and global issues,
- *the whole environment:* take into account all aspects of the environment and ensure that when trying to solve one environmental problem, another is not created, and
- *wider applications:* encourage people to adapt and apply what is learned at work to other aspects of their lives (VEEC, 1992).

The programs that are now in place at Linfox and the Parkroyal include formal and informal processes. Formal training courses are designed to increase awareness of environmental issues by employees and provide alternatives and ideas for reducing their environmental impact . Informal processes include such activities as staff reporting to the Environmental Education Strategy Committee ideas that have occurred to them, environmental 'showbags' being given to staff containing information on how they can become involved in environmental issues, both in the workplace and at home, and articles appearing in internal newsletters.

These programs incorporate current thinking on environmental education both in their suggestion that people should be encouraged to apply what is learned at work to their personal lives and by including an 'action focus', that is promoting behavioural change.

## PROMOTING BEHAVIOURAL CHANGE IN THE WORKPLACE

### Educational techniques

It is arguable that the end goal of all environmental education should be behavioural change (eg. Winston, 1974; Stapp, 1971). Research has indicated that some educational strategies are more successful than others for producing behavioural change outcomes. Many researchers (eg Ramsey and Hungerford, 1984; Jordan et al, 1986; Hungerford and Volk, 1990) have shown that the most effective way of promoting change in behaviour is to train students in the skills they need or to use case studies as a way of demonstrating how action can be taken.

An evaluation of the Sydney Water 'CARE' staff environmental education program found that participants were less likely to report change in their environmental protection behaviour at work than at home (Walker, 1995). This highlighted a perceived lack of power to implement change in the workplace which this strategy of empowering staff through training in environmental action strategies could help to address.

Effective behavioural change programs should use ecological concepts as a basis for learning and increase learners' expectancy of reinforcement for acting in responsible ways by ensuring that they understand that behaviour which protects the environment is valued by the organisation (Hungerford and Volk, 1990). Programs should also give an in-depth knowledge of issues and teach issue analysis.

Increased environmental sensitivity (in the sense of receptiveness to natural environments) has also been linked to behavioural change (Hungerford and Volk, 1990). Providing opportunities for staff to increase environmental sensitivity can be difficult in work place settings. This could be achieved through informal activities such as weekend canoeing trips or walks which also have some link to work activities.

The potential for an experiential approach to learning about environmental issues should also be explored. Experiential techniques such as imitation and role play have been identified by Horsley (1977) as being effective means of bringing about behavioural change.

Malcolm (1992) argues that people's own day to day environments are a particularly meaningful focus for environmental education. It is, therefore, essential to tailor programs to make them as relevant as possible to local conditions by drawing examples and foci from the participants' work, home and local environments. In the CARE evaluation (Walker, 1995) Sydney Water staff expressed interest in learning about local environmental issues. This indicated that they may be keen to take ownership of local issues in order to improve their own environment.

### Situational Factors

The importance of situational factors in producing behavioural change must also be emphasised. In Hines' meta analysis of research into behavioural change (Hines et. al., 1986/87) the importance of factors such as economic constraints, social pressures, and opportunities to choose different actions were emphasised. Changing behaviour appears to be a complex process which involves social norms and peer pressure, as much, or even more than, a structured education program.

> 'It is very difficult to increase an individual's commitment to personally save energy when such motivation is not embodied by general social attitudes and when structural and financial incentives exist to support the most inefficient forms of energy use. Thus an effective environmental education strategy needs to identify and help tackle those environmental practices which, by their very existence, inhibit environmental education (Malcolm, 1992).'

In the workplace context this means that environmental education cannot take place in isolation from other organisational change. Unless strategies are in place through which staff can implement changes they will soon be discouraged in their attempts to improve work practices.

The question of how long lived any behavioural change resulting from an education program will be is addressed by Gray (1985), who reports that both attitude and behavioural change brought about by a treatment tend to have only short term effects. Performance drops off dramatically when it is no longer reinforced.

Reinforcement can come from several levels in the workplace. From the trainers, by following up actions, from fellow staff, possibly by forming support groups, and from management. Although the involvement of staff in organisational change needs to be sought from a grass roots level rather than being imposed from above, this does not discount the importance of support from all levels of the organisation. The important role of middle or senior managers in the decision making process is argued by Henning (1984) and management's role in providing the incentive and ensuring that administrative difficulties are lessened is crucial in any process of reform.

Participation of managers, with their staff, in training sessions is essential. It is important that opportunities are built into training programs for discussion with management regarding environmental impact reduction and the ways management could assist in this.

### Education for sustainability: McDonalds-Sweden

McDonalds, Sweden is an example of an organisation which has made substantial use of environmental education as a strategy for change. They have been successful in producing a change in organisational culture because they have ensured that education was not used in isolation but as part of a coordinated approach to environmental management.

In Sweden, scientists regard McDonalds as the leading corporation operating within the principles of Ecologically Sustainable Development (ESD) (Change the Way, 1996). This is clearly a significant feat for an organisation which attracts quite the opposite type of publicity in many countries. McDonalds started to work with The Natural Step in 1993. The Natural Step is a network, originating in Sweden, which works with businesses and government to assist them in a move towards ESD.

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McDonalds commenced with a program to educate the executive group. The environmental program which resulted was linked to every part of the company's activity. ie. how employees live, how they get to work, how restaurants are constructed, how food is transported etc. Initially one person was trained in the Natural Step from each restaurant however a program is now underway to educate all 7000 staff. A CD Rom was produced which teaches staff about sustainability. McDonalds have also trained their suppliers in the Natural Step and have supported their development of environmental action programs. This assists the organisation to tackle environmental problems at the source (Change the Way, 1996).

Life cycle analysis demonstrated that where waste is fully recycled disposable packaging has less environmental impact than reusable crockery. 98% of waste in restaurants is now successfully recycled. The remaining 2% is waste that is brought into the restaurant by customers. McDonalds has become the largest educator of consumers on recycling and environmental issues in Sweden with over 80% of its customers separating waste correctly in restaurants last year. This was achieved through a coordinated education campaign.

Between 1993 and 1995 the perception in Sweden of McDonalds as an environmentally friendly company almost doubled from 30% to 58% while the negative perception almost halved (Change the Way, 1996). The advantages to the organisation of adopting an environmental management strategy which goes beyond regulatory requirements is clear. Sound environmental management is good business.

## CONCLUSION

Environmental management is likely to become an increasingly important measure of organisational performance. Organisations will be looking to environmental education as a means of bringing about the necessary cultural changes.

Environmental education programs in the workplace are likely to be most effective if they draw from educational techniques that research has shown to be effective in producing behavioural change. The education program must also not take place in isolation from other organisational change. Full management support for empowered staff to make the necessary changes in work practices is essential.

The workplace is potentially one of the most exciting areas of growth for environmental education. Environmental change in industry can have dramatic impacts on society's ability to move towards ESD. It is critical that the education that takes place within organisations uses approaches that provide exposure to environmental values rather than focusing on narrowly technical approaches that are unlikely to promote behavioural change.

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# Re-imagining landscapes, re-writing curriculum. A view from the Australian tropics

**Hilary Whitehouse**
**School of Education, James Cook University, Townsville, Qld, 4811**

## SUMMARY

Are there places and spaces within environmental education research and practice that we can re-imagine ourselves beyond the dualistic constructions of liberal humanism? Poststructuralist feminist insights make more apparent the discourses in which we are caught up and through which we produce our environmental knowledges and understandings. This paper offers a view from the tropics on the theory and practices of trying to write new ways of being within landscapes.

## Introduction:

> "If a child's vision of nature can already be loaded with complicating memories, myths and meanings, how much more elaborately wrought is the frame through which our adult eyes survey the landscape. For although we are accustomed to separate nature and human perception into two realms, they are, in fact, indivisible. Before it can ever be a repose for the senses, landscape is a work of the mind. Its scenery is built up as much from strata of memory as from layers of rock." (Schama, 1995 p. 6)

The question I ask in this paper is how might we better conceptually understand the relations between the discursive and textual practices of our culture as they relate to social action and desire, landscapes and environmental education. Each one of us has knowledge of how to be a subjective, gendered, embodied being within landscapes and we all have means of expressing that knowledge. We live in times of rapid social change, increasing social diversity, decreasing biological diversity. It is timely to investigate the ways in which individuals and groups come to speak/write landscapes (which I categorise as works of human imaginations) and socio-physical environments. And necessary to explore how individuals and groups are trying to re-speak/re-write new environmental discourses at a time of socio-ecological crisis, when it is felt the philosophical underpinnings of Western culture are failing people's desire to reconcile the discursive divide between 'nature' and 'culture' (Knudtson and Suzuki 1992, Mies and Shiva, 1993).

## The use of poststructuralist frameworks in environmental education

Gough (1996) argues the relevance of poststructuralist methodologies for environmental education research and practice - both for their power to undo the 'one true storyline' within liberal humanist educational discourses and for their power to re-cognise the multiplicities of stories, the multiple ways of being, knowing and becoming that are possible within our complex worlds. Davies writes that poststructuralist theory demonstrates the need to look at the work language does

> ...to limit, shape, make possible, one kind of world or another..it makes relevant the emotional, psychic and physical embeddedness of individuals in the discursively constituted categories to which they are subjected. Unlike any previous theoretical or conceptual framework...poststructuralist theory looks at the constitutive force of social structures and of language as well as the individual

> person (or subject) and sees each of these in their social and historical contexts. The individual subject is understood at one and the same time to be constituted through social structures and through language, and becomes a speaking subject, one who can continue to speak/write into existence those same structures through those same discourses (Davies 1993 p. xviii)

The illuminating part of this theoretical position is, that by viewing the person as "a speaking subject", it is possible to document how people "invent, invert and break old structures and patterns and discourses and thus speak/write into existence other ways of being" (Davies, 1993).

Poststructuralist theory has particular application to environmental behaviour. Making visible the discourses we are caught up in provides a framework for understanding our apparent contradictions. A close rational analysis of our actions can only lead to the conclusion that we are, in fact, highly irrational, in that we continually foul and waste our water, air, forests and companions on this earth. Indeed, this has been concluded by many environmental writers (Young 1991). Thus we behave 'irrationally' while framing ourselves within humanist discourses to be 'rational' beings and rational actors Environmental education attempts to persuade our children through linear argument that if they are rational, they will interact differently with environments. Jordanova (1980) points out that the "lack of fit" between ideas and experience clearly point to the ideological function of rationalism and the nature/culture/gender dichotomies.

Davies (1993) argues that liberal humanist discourse pervades school texts and leaves unchallenged the notion of the unitary rational actor or agent. Environmental education frames the student/learner as this rational actor, assuming that education 'for the environment' will lead the student to 'action on behalf of the environment'. The presumption of a linear relationship between the presentation of critical information and the desire for action that will be taken by the 'rational' student/learner, in contradiction of the mass of everyday practices which embed us all, is highly problematic. The majority of formal environmental education strategies are informational, in that information is provided 'on' and 'about' environments (Whitehouse 1993). Environments are defined within humanist frameworks, which Harding (1991) suggests can only give us a partial and distorted account of the world. Students/learners are located outside and distinct from that which they learn 'about' and they study human 'impact on' these externalised environments. We tend to frame 'impacts' negatively and rarely seem to celebrate the positive relationships between humans and landscapes (Schama 1995). The production of the discursive categories which function to actively maintain the opposition of 'nature' ("the environment) to 'culture' ("human impact on") also has consequences for gender equity practice.

Environmental education discourses have been critiqued from feminist perspectives as reproducing masculine relations and constructions of environment (Barron 1995, Di Chiro 1987, Gough 1992, Gough 1996, Taylor 1991, Taylor 1993, Whitehouse and Taylor 1996) Women and 'nature' have "an age old association - an affiliation that has persisted throughout culture, language and history" (Merchant 1989, p. xix). Those affiliations may be read in many ways (Ortner 1971). Within traditions of Western thought, the categories 'nature' and 'culture' are deeply entwined in a complex layer of meanings with the categories 'female' and 'male' and notions of femininity and masculinity (Lloyd 1984, Plant 1989, MacCormack and Strathern 1980, Merchant 1989, Merchant 1995). This is why it is necessary not just to examine the discursive constructions of landscapes but explore the discursive construction of gender as it is woven through landscape meanings.
Barron (1995) states that the implications for the positioning of girls and women and the positioning of the non-human world within environmental education are that "if masculine interpretations of environment remain as the 'correct' interpretation (then) the dualistic social order is left intact (and) the current social order of culture over nature is maintained".

Poststructuralism theorises that a person is much more than a rational mind in control of action and desire; desire may stem from rational argument, but desire also stems from "the inscribed bodies and emotions of each person, from images and storylines, from the imbrication of ways of knowing in the metaphors and patterns of the discourses through which we come to know"

(Davies, 1993 p. 12). If environmental education is to be more than ideology, then the use poststructuralist feminist techniques could validly add to a process of re-visioning how we shape environmental education research and practice.

### Questions of nature, gender and self

One of the projects of environmentalism and environmental activism in all its forms, has been that of re-visioning our western selves in relation to this slippery concept we term 'nature'. The poststructuralist feminist position is one of radical departure from the structuralist position which holds that binaries like nature - culture and female - male are foundational or fundamental to the human mind. As MacCormack (1980) has demonstrated, it is the mind which creates the myths in which these binaries are lodged. Words such as 'nature' are "polysemic" (1980, p.9). There is no one fixed or unitary meaning for the word 'nature', the meanings of 'nature' can be extended with the development of new metaphors. As Ortner (1974) has written, the categories of 'nature' and 'culture' are conceptual, "one can find no boundary out in the actual world between the two states or realms of being".

Poststructuralist feminist theorising (Davies 1993, 1994, 1996; Weedon 1987) can be used to make apparent how it is that we collectively and individually make sense of ourselves within landscapes. And how it is that we discursively constitute ourselves and 'environment(s)'. Working with senior high school students and adult environmentalists in tropical north Queensland, I have discovered that the discourses with which we frame our environmental talk and writings can be problematic and sometimes confusing and contradictory. Young people struggling to make sense of themselves as gendered, social and environmentally active beings have to make their way through a number of contradictory positions. I will illustrate some of those contradictions briefly here.

Elisabeth and Jane, both white and age 16, take outward bound courses and spend time hiking and camping in the Wet Tropics Management Area. Although they say they love to "get away and spend time in natural environments" their talk on the word 'nature' reveals some of the discursive confusion and polysemy possible when we discursively devise binaries for that which is indivisible.

This is an extract of a conversation we had on the meaning of the word 'nature'

Hilary: So tell me, what is nature?
Jane: Nature is untouched landscape.
Elisabeth: Yeah I reckon. When someone says 'nature' to me I think of the bush and wilderness, uncivilised and messy and beautiful.
Hilary: Are weeds nature?
Elisabeth: Yes.
Hilary: And what about gardens. Are gardens nature?
Elisabeth: Not really. It's not really nature if it's in a garden. That's man made nature. So really it's not nature. Like in the botanical gardens and that. It's just been put there and it grows, like naturally, but it isn't there naturally.
Jane: A weed is nature but it's not the romantic type of nature that you think of when you think of like, rainforests and stuff like that.
Hilary: So, what's the difference?
Elisabeth: Well, like between a weed and a palm tree, it's just society has built it up to be like that and like writers and poems have made a palm tree seem romantic and a weed seem ugly. It's nothing to do with God's view of nature.
Jane: Nature is plants.
Hilary: Okay, if nature is plants, how come a weed isn't nature?
Jane: It is, it is.
Elisabeth: It's just not the romantic nature that a lot of people like, but it is nature. Yeah.
Jane: If people want to get back to nature they don't go to a weed garden, they prefer to go to somewhere more beautiful.

Elisabeth: But some weeds are nicer than some plants. Like those weeds up at Malanda, with those little pink flowers, they are really pretty.
Jane: But that's man made if you really think about it. Those weeds grow on cleared farming land.
Elisabeth: Yeah but man didn't put them there to look beautiful, like the plants in the botanical gardens, it's not man made like that.
Hilary: Now I'm really confused.
Elisabeth: In the botanical gardens people put beautiful plants there so that they'll look beautiful and people will go to see it. You know, the touristy thing. But those weeds at Malanda, nobody's put them there to look beautiful, they were not put there, they just grow there, it's the natural course of nature.
Hilary: So is it (the flowering 'weed') nature?
Elisabeth: Yeah, but it seems a pest.
Jane: No, I don't really see it as nature because the only reason it grows there is because man has cleared real nature. Nature is natural.
Elisabeth: Yeah, true, but the weed is more natural than a plant in the botanical gardens, and people see the gardens as nature.
Hilary: If I plant rainforest trees in my garden, is that nature?
Jane: It is to an extent but it is not natural. I think it would be better (more natural) to build your house among the trees that are there to begin with. Nature is provided by God, it's not provided by people.
Elisabeth: It's like those easter egg baskets that you can buy at Easter time. You can buy them made or get the materials to make your own. The ones that you get all fully made up
Jane: Are nature (laughs)

Within environmental education discourse we tend to use the word 'nature' as if it were an unproblematic, unitary concept. My discussion with Elisabeth and Jane showed that trying to define what 'nature' is in practice, is confused and highly problematic. Elisabeth and Jane both took the meaning of the word to be something 'out-there-and-not-of-us' and then tried to locate weeds and palm trees in planted gardens at points between this discursive division "man" and "nature"/"God". Flowering weeds are not 'nature' because they grow in cleared farmland, but they have the character of nature in that weeds grow "naturally". The cleared rainforest/"wilderness" is 'nature' because it's existence is separate to that of "man". Elisabeth and Jane are both academic high achievers and aware of gender equity issues. Yet in this conversation they reveal just how difficult it is to escape the deep discursive binary of 'man' and nature/God.

We talk and write about reconciling humans with nature, of revaluing the 'natural' world, of educating for 'the environment', of encouraging environmental action and see these projects as fundamental to the aims of environmental education. But by leaving unchallenged the unequal power/value relationships caught up with the production of the nature-culture binary, there are still problems for students/learners who wish to take up environmental action.

Anne, white, age 17, won an environmental award for her recycling efforts at school. Finishing Year 12 she is considering tertiary training as an environmental engineer. The category 'nature' exists in hierarchical opposition to the dominant category 'culture' and Anne finds that there is some social danger in identifying herself too closely with the category 'nature', as environmental activists who are "greenies" are seen to do.

> A lot of people have this picture which really annoys me, really bugs me, (that) environmentalists tie themselves to trees or handcuff themselves to something. And every time I say I want to be an environmental scientist, it's always "Oh no, not another greenie". I even get that from some of my family and I'm like; "no, no, no. I don't want to be a greenie, I want to be an environmental scientist". I'm not the person out there tying myself to the tree. I want to be the person looking for

> solutions, looking for ways to compromise, not just putting my life at risk because of trees.
>
> I say to them (my family) "Look, I don't want to be a greenie. I just want to be an environmental scientist thinking up solutions and that". And they're pretty accepting as soon as I say I don't want to be a greenie. They're like "Okay, that's fine". But I would like to see their reaction if I did say "Oh yeah, I want to be a greenie".

The binary creates emotional conflict for Anne, who knows she must side with the 'nature' side of the binary if she is to do good and meaningful work, but she risks social censure if her actions and her sympathies are seen to lie in opposition to the social world of her family and friends who are suspicious of that identification. "Greenie" is used as a term of social opprobrium in Anne's circles (though other people I've interviewed declare themselves as "greenies" with some sense of pride). The hierarchical valuing of the human social world over that which we categorise as 'nature' causes Anne problems as she tries to reconcile her desire for environmental action with her desire to fit comfortably within her social world at this very demanding time of her life.

This boundary that we create between our human and 'the natural' is a legacy of the Cartesian strategy, the effect of which "is to enforce a strict and total division..between mind and nature and between human and animal" (Plumwood 1993, p. 115). The reconciliation project becomes a transgressive act of re-imagining ourselves beyond this boundary. If Descartes could imagine himself as a mind/brain/head separate from his body (a peculiarly European act of imagination - see Mc Veigh (1996)), and imagine himself out of his animality, then it is possible for us to re-imagine ourselves across these discursive boundaries. For they are not boundaries of the flesh.

Living as I do in tropical Australia I have increasingly experienced this blurring of boundaries, these excursions of imagination beyond binary thinking. After I had the experience of a severe dog-hookworm infestation I realised I no longer knew what 'nature' was, if nature was to be constructed as something apart from myself. Hookworm have a somatic stage in their life cycle. You pick them up walking barefoot in the grass. Once they burrow in, hookworm spend time inhabiting your body before moving on to the gut, where they can be knocked off with Mebendazole. It was during this prolonged somatic phase that I found I could no longer imagine the worms as being separate from, or even different from, my body. I annoyed and grossed out my friends by referring to myself as a 'wormbag'. But I could not see these worms as 'nature' in opposition to my being 'culture'. The worms were 'nature' and I was 'nature'. I was both habitat and landscape, and until they migrated these worms were enfleshed within me.

Similarly, I no longer feel I know what 'the natural environment' is, when I live in a place where the garden actively tries to grow into my house, where a stand of Evodia mulleri have replaced the need for curtains in the front room, where I can sometimes count thirty geckos running in one room and a big black spider ha spun her web directly above my bed for the last few months, mopping up the mosquito clouds. The mosquitoes, the geckos, the spiders, the growing things that tendril across the enclosed verandah, the eight foot diamond python that curled about the water heater in winter, all occupy my internal domestic space. If they are all part of my domesticity and I really do not mind them, are these undomesticated snake, spider and gecko bodies still part of 'the environment'? Or have they transgressed the boundaries to culture? Or is it I who have transgressed and am now attempting to write myself differently, to re-vision myself with respect to domestic and external landscapes by not minding these unruly animal and plant bodies in my household, by not chasing them 'out' with the broom?

## Writing landscapes

In his 1995 historical excavation, *Landscape and Memory*, Schama (1995) suggests that "landscape may be a text on which generations write their recurring obsessions" (p. 12). Taking up this notion of landscape as text, it is therefore possible to undertake a textual analysis of tropical landscapes. This is not to say that the landscape itself is an inanimate object, or a simple repository for meaning

- though it can be seen as these things. The human dialogue with landscapes can also be read as one in which landscapes 'write back'. Schama (1995) argues that "landscapes are culture before they are nature; constructs of the imagination projected onto wood, water and rock....But it should be acknowledged that once a certain idea of landscape, a myth, a vision, establishes itself in an actual place, it has a peculiar way of muddling categories, of making metaphors more real than their referents; of becoming, in fact, part of the scenery" (p. 60).

In exploring the language practices by which we speak/write tropical landscapes into existence, making meaning of physical realities, it is necessary to explore the cultural myths, discourses and memories so embedded in environmental forms, that our perceptions of rock, rain, forests, air, light and oceans write and re-write us as embodied and engendered subjects. I give the example here of the words of Terry, a 22 year old white environmentalist, who has been very active with the Oyster Point (Hinchinbrook) campaign. His talk reveals a complex interplay of environmental meanings, the sexuality and genderedness of landscape. Masculinity is interwoven with the land in such a way that the men Terry talks about define (are writing) the landscape and in turn the landscape reciprocates by defining (writing) the men.

> North Queensland men are hard, and they're hard because they've worked hard and they've had hard experiences and they've had hard times and they've lived hard, they've played hard, and they've done hard tasks and they've conquered these hard tasks and therefore they have the right to be hard in character because they can back themselves up with these tall tales about their hard living and a lot of this hard living goes on in hard landscapes - hard areas where the sun shimmers off the land in the distance. (quote from Davies and Whitehouse 1997 - in press)

Terry spent much of his life in Mount Isa, and he recollects the arid landscape and his body as intimate reflections of each other. He describes his life in the Isa as "being trapped on land" saying "oh, you feel very dry physically, you feel emotionally dry as well". Terry does not imagine his human body and the character of his internal emotional landscape to be different from the external landscape of "the Isa". He allows the landscape to define/write him. In his talk he is revealed as doing serious work on disrupting and reworking the nature-culture binary, however partial and incomplete that work may be. He does not distinguish between his character, or those of the men he knows and the character of the arid tropical landscape. Terry's willingness to take up environmental action sits alongside his reworking of the discursive strategies by which he produces himself in relation to landscapes.

Sylvia Ditchburn, the North Queensland visual artist well known for her intensely coloured work, has actually abandoned the use of terms which divide the inner aesthetic self from an externalised tropical environment. Instead she talks now of 'in-scapes' and 'out-scapes' and uses those terms as an expression of the inextricability of her emotional responses and the brilliant forms and bodies that collectively constitute tropical landscapes. Sylvia is searching for new ways in which to write and re-write the texts of her experiences, experimenting with language to constitute alternative ways of being and knowing.

The rationale for attempting an understanding of how people write/re-write tropical landscapes, and how, in fact, landscapes 'write back', creating identities through placement and imagination, is that these understandings can then be applied to an analysis of environmental education practice. Are the conceptual frameworks of environmental education able to accommodate the possible shifts in discursive practice taking place? Or are environmental education practices still embedded within liberal humanist discourse leaving unchallenged the philosophical underpinnings which divide nature from culture and individuals from landscapes? Applying new theoretical frameworks, as Gough (1996) suggests, seems to offer some exciting possibilities.

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